Bio-logic®

Sleepscan® and Ceegraph® Netlink™ and Netlink ICU

Service Manual

590-NETSM1
Rev. E
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Precautions and safety instructions

IMPORTANT

Only qualified personnel should use this device. Please read this section and the Ceegraph or Sleepscan Operator's manual before installing any of the hardware. Keep this section as a reference when you operate, transport, store, or re-install the system.

Equipment identification labels and markings

Classification

The International Electrotechnical Commission classifies electro-medical equipment according to its power source (external or internal) and the degree of protection it provides against shock. The Netlink and Netlink ICU is **Class II, Type B and BF**. This means it qualifies as externally powered equipment that can protect a patient from electrical shock if electrical parts (such as electrodes) have been applied to the patient.

Warning labels and symbols

Standard, internationally recognized symbols can avoid language differences and provide instant comprehension of warnings and cautions in a restricted space. These symbols appear on all Netlink and Netlink ICU equipment or in Netlink documentation:

WARNING

Extreme danger. Injury or death is possible. Consult accompanying documents

TYPE BF EQUIPMENT

Patient applied parts (electrodes)

TYPE B EQUIPMENT

Other Patient parts

Electrical requirements

Use these requirements to avoid noise interference while recording electrical activity from patients and to make sure of a consistent electrical environment for the computer system.

Isolated or non-isolated power

Although this system functions with non-isolated power, Natus Medical Incorporated recommends an isolated power source for maximum efficiency and safety.

15 or 20 amps

Although 15 amps is acceptable in smaller systems, Natus Medical Incorporated prefers 20 amp service any time the system in use supports a large number of features.

BTU offset

A Natus Medical Incorporated computer system releases a maximum of 2000 BTU per hour.

Magnetic field

A Natus Medical Incorporated computer system operates without any interference in a magnetic field of 0.05 Gauss.

Room shielding

Natus Medical Incorporated recommends room shielding but does not require it. Users may use shielding if the room is close to equipment that generates electrical "noise." Shielding is an important safety precaution wherever noise is a potential problem.

Fluorescent lights

Natus Medical Incorporated recommends incandescent lights, but the system can operate in a room with fluorescent lights.

Note: Dimmer switches can produce noise interference unless the switch is set to full ON.

Thickness of the conduit

Thickness for the conduit and for all electrical installations must meet the National Electrical Code and applicable local codes.

Electrical installation requirements

Install all system equipment at a properly grounded site. This section presents detailed information about how to make sure the installation site meets requirements.

WARNING

Improper electrical installation can cause electric shock to either the patient or the user. It can also damage system equipment. Make sure patient electrodes DO NOT make contact with any conductive material (including the outside chassis of the computer).

Grounding requirements

The installation site must have a grounding wire that connects the system equipment to a grounded terminal (Earth). The grounded terminal must connect to the steel skeleton of the building or under the main reinforcing steel. Any multiple grounding wires must ground at the same point. (One point grounding.) The shield room or bed must also ground at the same grounding terminal as the installation site.

Power plug requirements

Use only these configurations for the power plug:

- **A 3-pin power plug**: This requires a 3-pin wall socket with a properly installed grounding pole. Make sure that the wall receptacle is correctly grounded before inserting the 3-pin power plug.
- **A 2-pin/3-pin adapter**: This connects 3-pin power supply plugs to a 2-pin wall socket. The grounding terminal on the adapter must secure to the ground terminal.
- **A 2-pin power plug with a grounding terminal**: This is for a 2-pin wall socket: The grounding terminal on this power plug must secure to the ground terminal

Types of grounding for hospital facilities

Use this information to make sure the installation site has appropriate grounding:

Grounding resistance:	The ground resistance of the grounding poles for the medical equipment must be 10 ohms or less.
Protective grounding:	Protective grounding must let leakage current flow into the ground for patient safety.
Functional grounding:	This type of grounding is not required for patient safety. It helps eliminate hums.

Environmental specifications

Temperature

Operating: 15 to 40º C (59 to 104º F)

Storage: -20 to 70º C (-68 to 158º F)

Humidity

Operating: 15% to 95% at 40º C (104º F) non-condensing

Storage: Maximum 90% at 65º C (149º F)

Note: These are maximums and do not reflect typical or recommended operating or storage environments.

Condensation

Recovery time after condensation to operational specification: 24 hours

Flammability

UL94V-O

EMC specifications

CISPR 11 B Conducted and CISPR 11A Radiated Emmisions

EN 61000-4-3 Radiated Susceptibility Test

EN 61000-4-4 Transient Susceptibility Test

EN 61000-4-5 Surge Susceptibility Test

EN 61000-4-6 Conducted Immunity Test

EN 61000-4-8 Magnetic Fields Test

EN 61000-4-11 Voltage Fluctuations Test

EN 61000-3-2 and EN 61000-3-3 Dips and Flicker Test

RS 101 Magnetic Immunity and RE 101 Magnetic Emmissions Test

Installation precautions

Use these precautions when installing or re-installing this system and equipment:

Environmental conditions

- Select a room with properly grounded power sources. Reliable grounding requires hospital-grade receptacles and power cord.
- Neither use nor store this system near storage locations for chemicals or where gas leaks may occur.
- Avoid moisture or contact with water, extreme atmospheric pressure, excessive humidity and temperatures, poorly ventilated areas, saline, or sulphuric air.
- Make sure the installation site maintains a relative humidity between 15% and 95% (without condensation).
- Make sure the installation site meets all the requirements in the Environmental Specifications section of this document (turn to that section for more information).
- Although there are no known susceptibilities to electromagnetic phenomena, there is always a possibility that electromagnetic interference may affect system operation.

Room Topography

- Place all equipment on an even, level surface. Avoid the possibility of mechanical shock or vibration during setup, system operation, or system relocation.
- Make sure that the iso-transformer and all portable multiple socket outlets are off the floor and in a dry location

WARNING

Only use the Power Supply Model Number 520-PS5V5A with the Netlink and Netlink ICU amplifier.

System Hookups

- The Netlink and Netlink ICU headboxes are to be used only with their associated power supplies, which are certified medical grade.
- System computer must plug into an approved isolation transformer unless the computer is using an approved medical grade power supply.
- Verify that the maximum load for any multiple portable socket-outlet is less than 750 VA.
- Use the multiple socket-outlets to power only equipment that is a part of the Netlink and Netlink ICU systems. (Additional equipment may increase leakage and exceed the safety limit for connecting a patient.)
- Connect multiple pieces of equipment only after verifying that the sum of all leakage currents is less than the safety limit for connecting a patient.
- Connect no non-medical electrical equipment directly to a wall outlet if the Netlink or Netlink ICU system is using a multiple portable socket-outlet with a separating iso-transformer. (Additional equipment may increase leakage and exceed the safety limit for connecting a patient.)
- Connect no equipment with potential electromagnetic or other types of interference. This could cause incorrect operation of the equipment
- Verify that the equipment connects to a power line source with the following frequency, voltage, and current capacity.

Frequency:	50 / 60 Hz
Voltage:	100 - 240 VAC
Current Capacity:	0.75-0.35 A

Installation verification

To make sure that all system equipment is installed correctly before use:

—Verify that all equipment and cables are undamaged and in perfect working condition.

—Verify that all equipment and cables are connected according to the instructions in this manual.

—Verify that no unauthorized equipment is connected to the system.

—Verify that the equipment is properly grounded.

—Verify that all circuitry with a direct connection to the patient has been checked twice.

—Verify that all system or equipment batteries show the correct voltage and are in perfect working condition.

Precautions during system operation

CAUTION

This equipment is not protected from a cardiac defibrillator discharge. Using a defibrillator while a patient is connected to the system equipment may permanently damage the equipment.

When using a defibrillator, either protect the equipment against defibrillator discharge or remove all patient cables, transducers, or both to avoid system damage. See **Caution** above.

WARNING

Never turn power on or off with a patient connected to the system.

1. Follow all safety procedures; give careful and constant attention to the patient and system equipment.

2. The Netlink/Netlink ICU does not provide protection against patient burns when used with electro-surgical equipment. Follow hospital procedures to verify that all electrodes are properly applied in order to prevent patient burns while using electro-surgical equipment.

3. Turn system power on BEFORE you attach electrodes to the patient. Remove the electrodes from the patient BEFORE you turn the system power off. This avoids shock hazards from power surges.

4. Caution should be taken when simultaneously connecting Netlink/Netlink ICU and other patient-connected equipment, to insure that hazards to the patient are not introduced through incorrect or inappropriate hookups.

5. Attach electrodes to the patient and the system hardware so that the electrode cables can neither entangle nor strangle the patient.

6. Avoid direct contact between the patient and system equipment at all times.

7. Do not add other equipment that is not protected against ingress of liquids.

8. This equipment is not suitable for use in areas of flammable or anesthetic mixture.

Electrostatic Discharge (ESD) precautions

WARNING

Do not remove PC boards from their protective bags or open your computer until you have read the information below. Please follow the instructions provided to avoid damaging the electronic components of your system.

WHAT YOU MUST DO

Enclosed in your shipment is a package that contains a disposable wrist strap. The instructions for use appear on the package. The black end of the strap wraps and adheres around the wrist. The adhesive is hypo-allergenic. The adhesive-backed copper foil at the other end adheres to any convenient electrical ground. A convenient location is the (non-painted) metal chassis of the computer. You must, however, leave the computer plugged into the isolation transformer in order to provide a ground path. Be sure the switch on the Isolation Transformer is OFF. (**DO NOT** turn the power on while you are strapped to the equipment!) Other convenient grounds are available at visible conduits and water pipes (items cannot be painted). Once you are grounded via the disposable strap, you may safely touch exposed electronics and PC boards. If you must lay a PC board down, lay it on the computer chassis or use the protective bag.

ELECTROSTATIC DISCHARGE (ESD)

Everyone is aware of the shock that sometimes occurs when they touch a door knob. This shock is the discharge of an electrostatic charge on your body. A static charge happens when two separate surfaces have too many or too few electrons. One surface loses electrons to the other. The types of materials involved and the speed and duration of motion between them determine the charge level. The list that follows shows common actions that generate a static charge and the typical electrostatic voltages that your body can acquire (depending on humidity).

Walking across carpet:	1,500 volts – 35,000 volts
Walking across vinyl floor:	250 volts – 12,000 volts
Picking up poly bag:	1,200 volts – 20,000 volts

Relatively low levels of static electricity can destroy or degrade certain electronic components. Levels as low as 100 volts can seriously affect the performance of your equipment; from degraded performance to total system failure. Some component degradation may result in total failure when that component must operate at or near its rated limit. Consequently, safe practice demands that you protect the devices at all times from static charge and voltage fields.

Follow these ESD guidelines to ground the system equipment properly. Make sure you ground all system equipment before you start any user, maintenance, or calibration procedure.

1. Put on a grounded wrist strap before touching anything inside the computer.

NOTE: Natus Medical Incorporated packages a disposable, hypoallergenic, adhesive wrist strap with some pieces of equipment. Follow instructions on the package to make sure of proper grounding at all times when working on the equipment. A convenient electrical ground is the non-painted metal chassis of the computer. Other convenient grounds are non-painted water pipes and conduits.

2. Make sure all equipment is turned OFF.

3. Make sure the wrist strap is grounded to earth ground.

   Once the system equipment is OFF and properly grounded, it is safe to touch the system PC boards and components. If you must remove a PC board and lay it down, place it on the grounded computer chassis or in the ESD protective bag.

The quality of your equipment depends a great deal on the reliability of the electronics. We make every attempt at Bio-logic to handle the equipment and parts in an ESD safe environment. By continuing that practice you can avoid ESD failures and degradation in your equipment. If you would like additional information on ESD and its effects, make contact with the Customer Support Department.

Maintenance

The Natus Medical Incorporated Netlink and Netlink ICU require professional maintenance and repair service. Never attempt to alter, modify, or repair this equipment alone. If the Netlink or Netlink ICU is not functioning properly, mark all defective parts clearly to prevent accidental use before the appropriate repairs can be made. When using a defibrillator, either protect the equipment against defibrillator discharge or remove all patient cables and/or transducers to avoid system damage.

ABOUT THIS MANUAL

This manual contains information about the maintenance of the Bio-logic System Corp. Netlink or Netlink ICU™ Amplifier Module and associated system components for the Ceegraph™ System, Sleepscan™ System, and their associated hardware and software. It focuses most on the service and maintenance of hardware components and contains assembly, disassembly, repair, installation, and troubleshooting procedures. General information about the computer and its peripherals (such as the keyboard, monitor, disk drives, or motherboard) appears in third-party (non-Bio-logic) service manuals. For information about how to use the Ceegraph System or the Sleepscan System, please see their respective *User's Manual.*

Notes

Use this page for your own notes.

System Overview

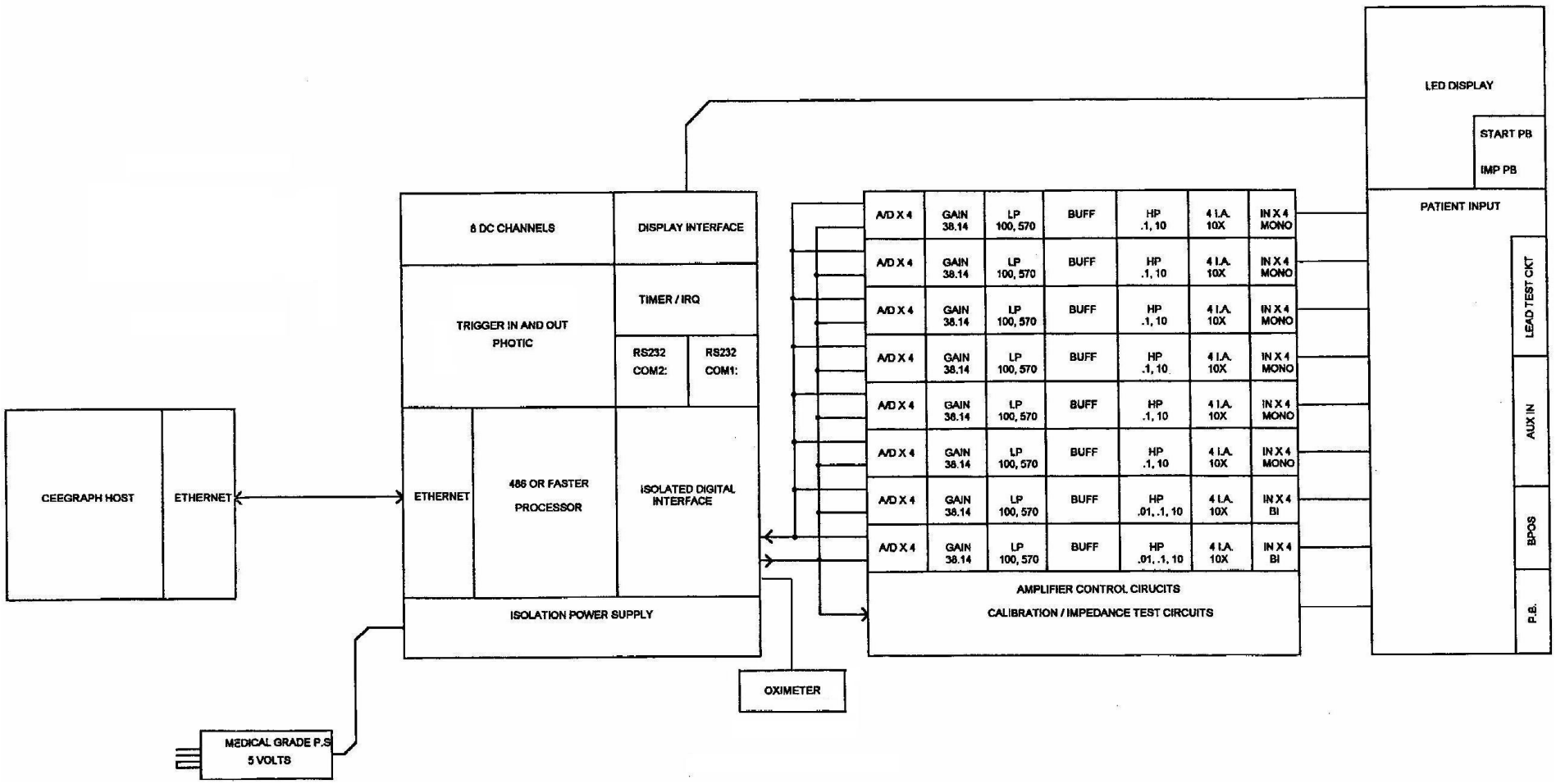
This section introduces the Netlink and Netlink ICU system. It contains basic information about the system, its components, and its theory of operation.

Operational Overview

The Bio-logic Systems Corporation® Netlink™ and Netlink ICU system is a paperlesss, computer-based device that collects and analyzes EEG (Ceegraph) and Sleep activity (Sleepscan). The Netlink's software program works with customized hardware components to give you a powerful, flexible EEG and Sleep collection and analysis system.

During collection, the software displays incoming data signals as waveforms on the computer screen (monitor). At the same time, it records these signals to a data file on the computer's hard disk (or other selected storage device). After data collection, users can read data from the disk and display or print any part of the data file on the screen.

Theory of Operation



Block Diagram of the Netlink™ or Netlink ICU Amplifier

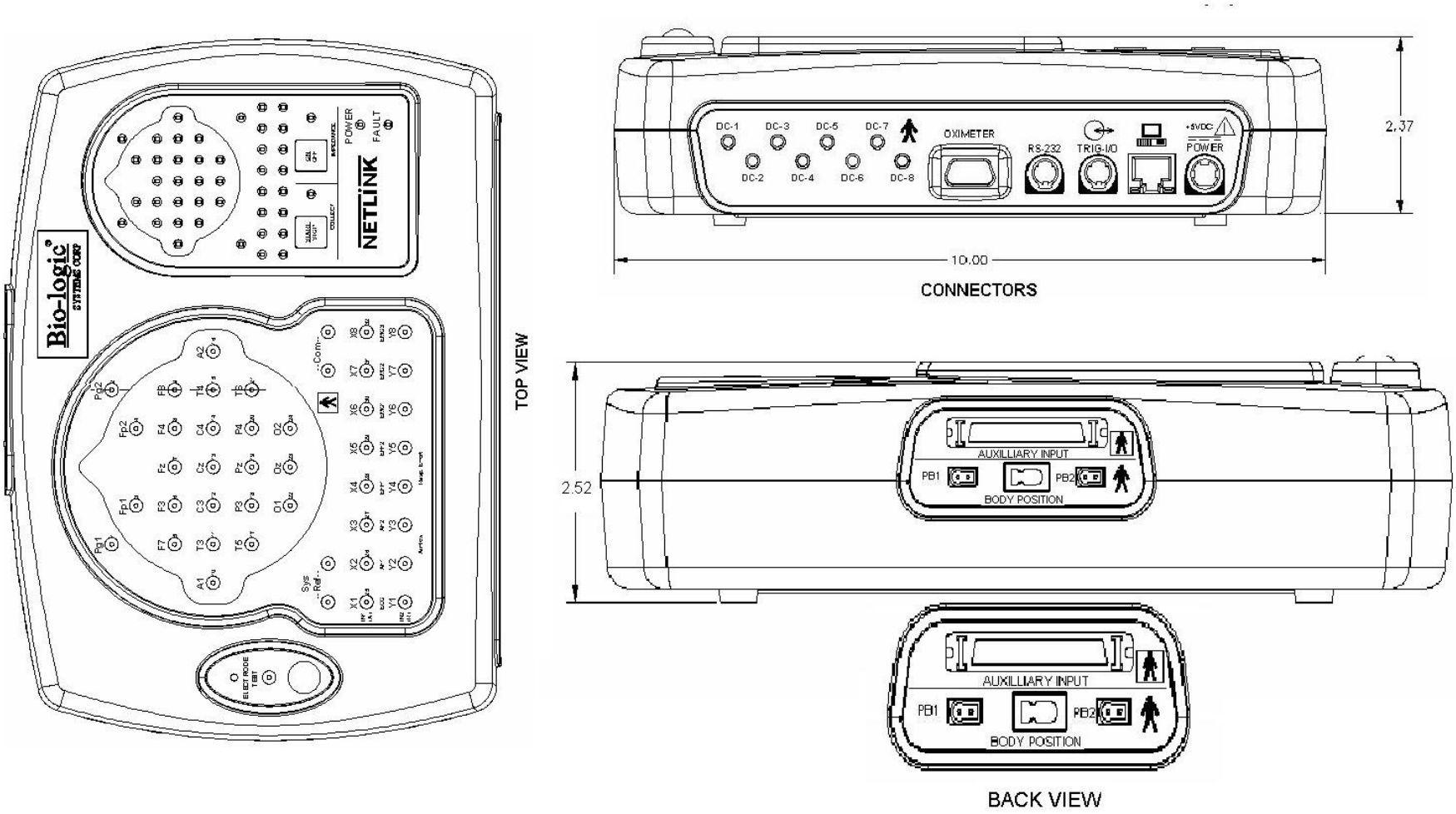
Data Collection

Amplification, filtering, and Analog-to-digital conversion circuitry for the system reside in the Netlink or Netlink ICU amplifier module (headbox). The illustration shows a block diagram of this device. During data collection, analog EEG signals travel from electrodes on the patient to the system headbox.. Hardware in the headbox amplifies, filters, and converts analog signals into digital values and then sends those values to the computer. There, the computer stores them in its memory. Typically, the system displays the data on the computer's monitor during the collection process and then saves that data to a disk or other storage device for storage after analysis.

Data Analysis

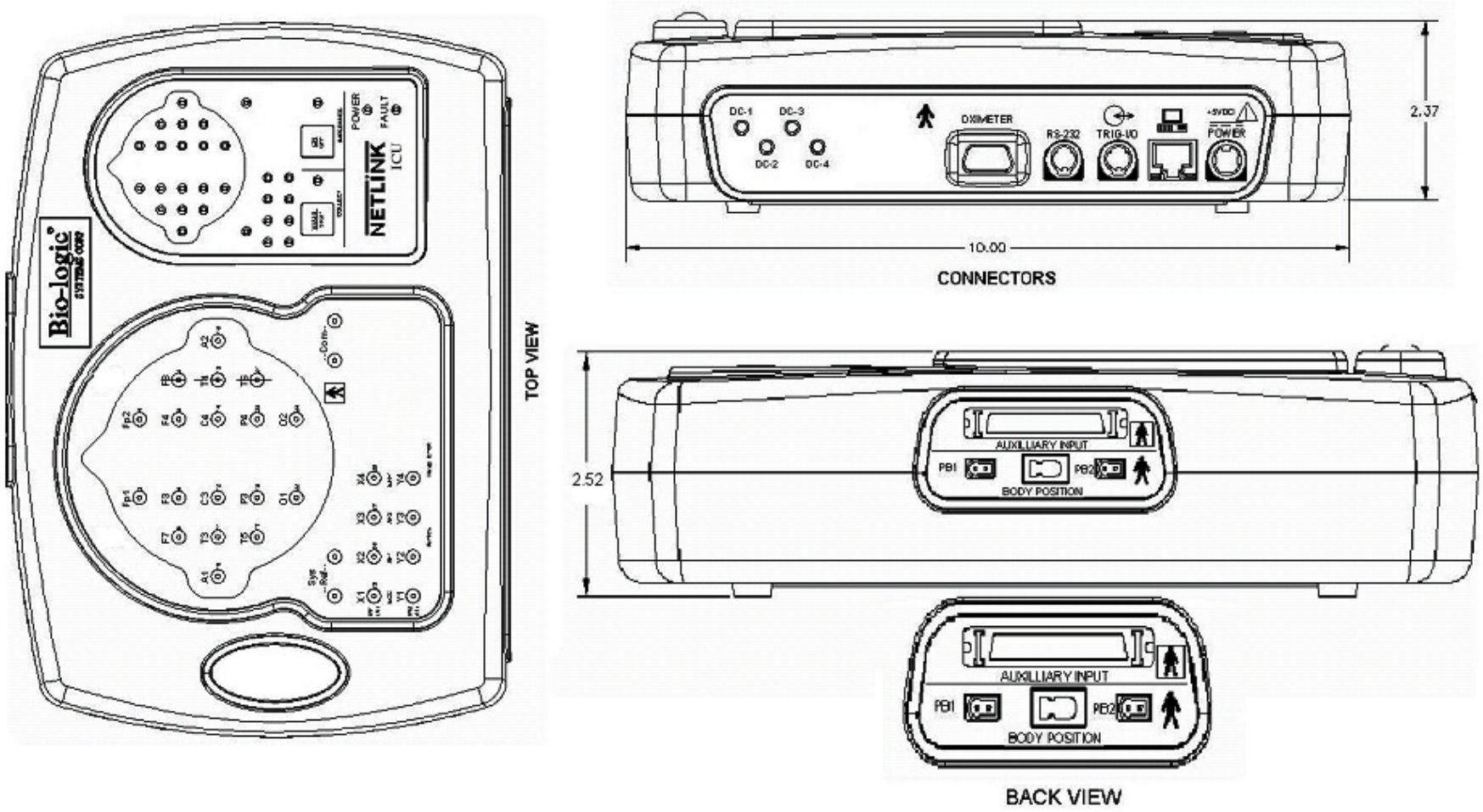
During data analysis, the program retains the digitized patient data in the system computer hardware. This lets the Ceegraph or Sleepscan program perform data analysis before the system saves the data to a storage disk.

Hardware

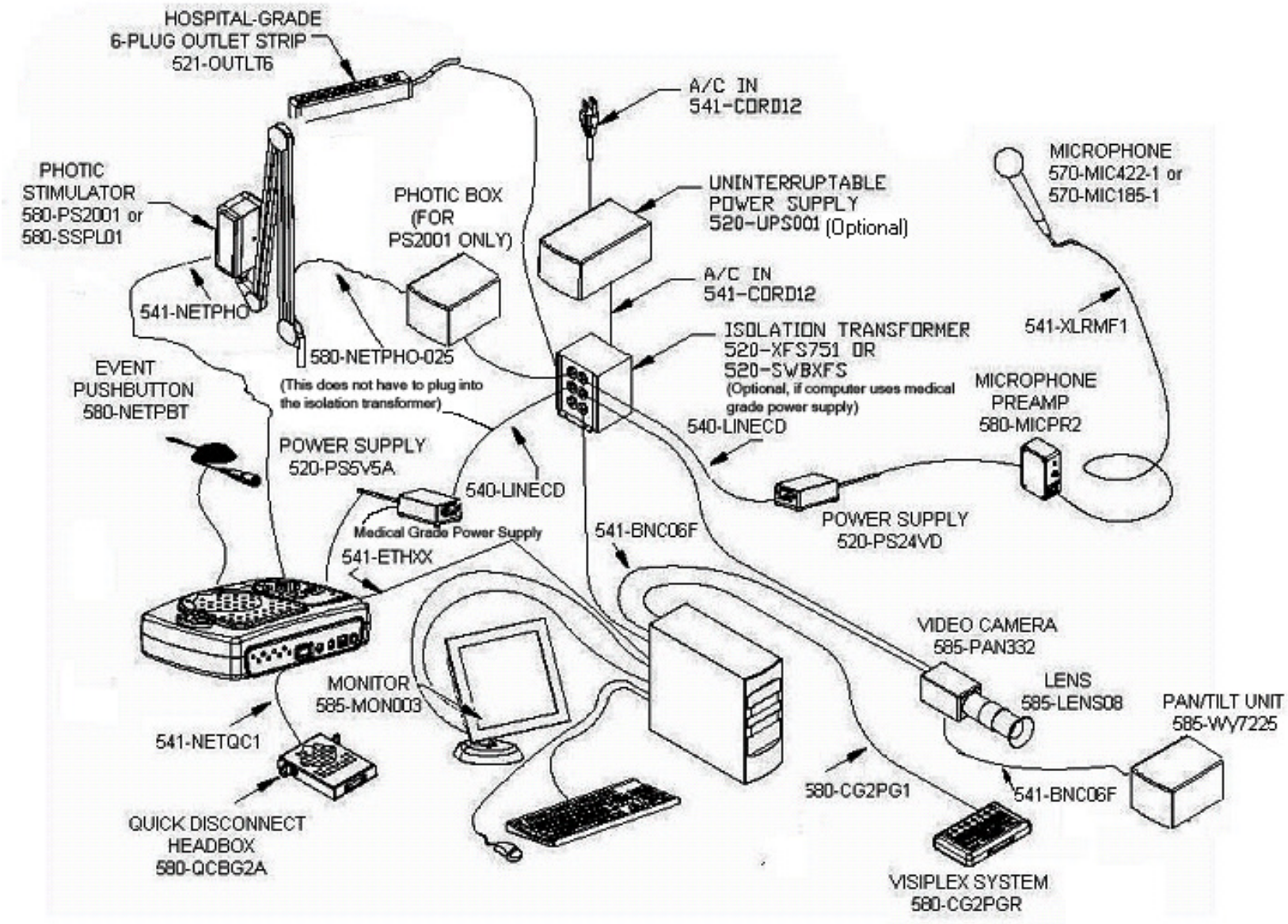


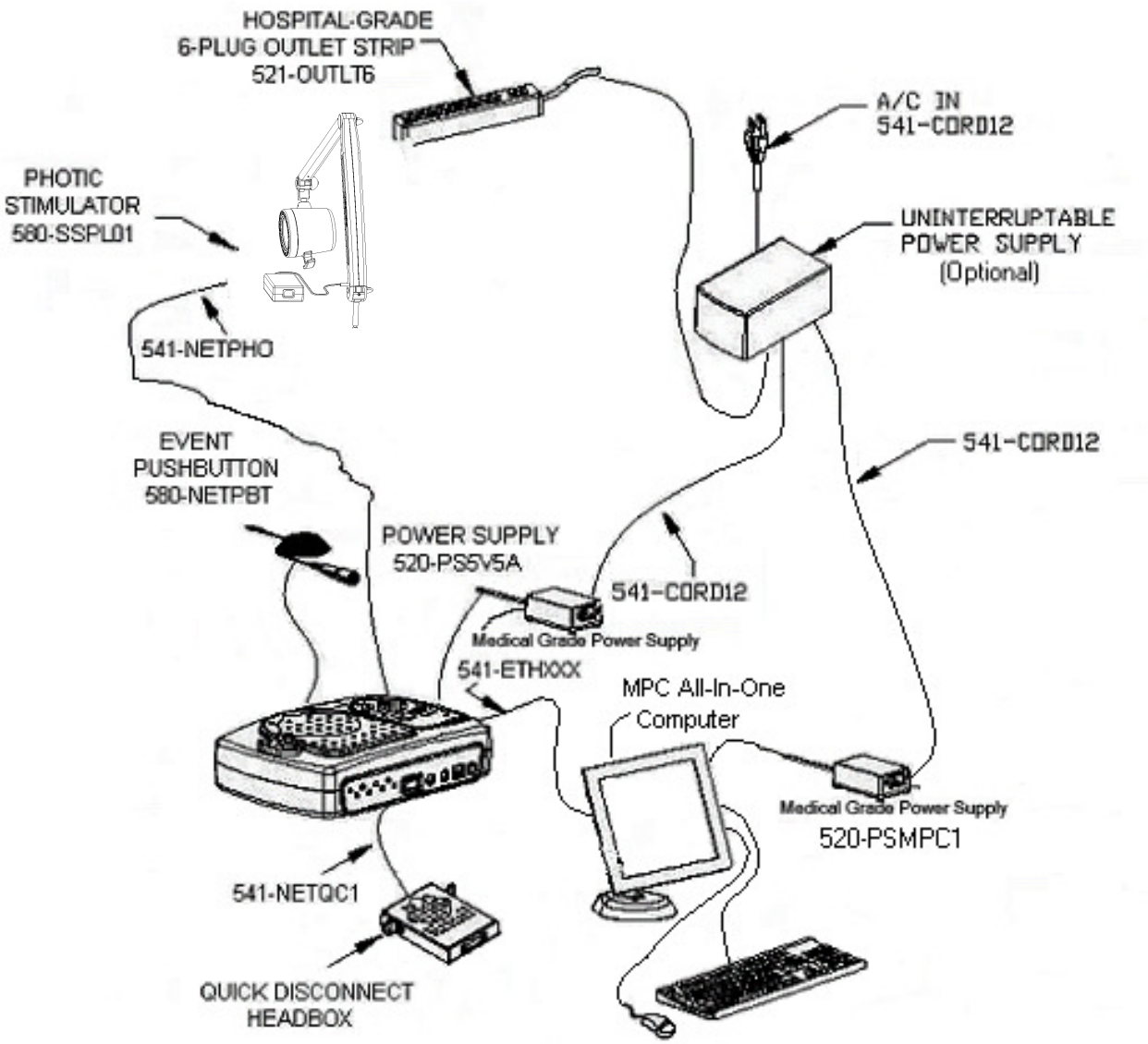
NETLINK™ Amplifier Box

Hardware



Netlink ICU Amplifier Box


HOSPITAL-GRADE
6-PLUG OUTLET STRIP
521-OUTLT6
A/C IN
541-CORD12
MICROPHONE
570-MIC422-1 or
570-MIC185-1
PHOTIC
STIMULATOR
580-PS2001 or
580-SSPL01
PHOTIC BOX
(FOR
PS2001 ONLY)
UNINTERRUPTABLE
POWER SUPPLY
520-UPS001 (Optional)
A/C IN
541-CORD12
541-NETPHO
580-NETPHO-025
ISOLATION TRANSFORMER
520-XFS751 OR
520-SWBXFS
(Optional, if computer uses medical
grade power supply)
541-XLRMF1
EVENT
PUSHBUTTON
580-NETPBT
(This does not have to plug into
the isolation transformer)
MICROPHONE
PREAMP
580-MICPR2
540-LINECD
POWER SUPPLY
520-PS5V5A
540-LINECD
POWER SUPPLY
520-PS24VD
Medical Grade Power Supply
541-BNC06F
541-ETHXX
VIDEO CAMERA
585-PAN332
LENS
585-LENS08
PAN/TILT UNIT
585-WV7225
MONITOR
585-MON003
541-NETQC1
580-CG2PG1
541-BNC06F
QUICK DISCONNECT
HEADBOX
580-QCBG2A
VISIPLEX SYSTEM
580-CG2PGR


HOSPITAL-GRADE
6-PLUG OUTLET STRIP
521-OUTLT6
A/C IN
541-CORD12
PHOTIC
STIMULATOR
580-SSPL01
UNINTERRUPTABLE
POWER SUPPLY
(Optional)
541-NETPHO
EVENT
PUSHBUTTON
580-NETPBT
541-CORD12
POWER SUPPLY
520-PS5V5A
541-CORD12
Medical Grade Power Supply
541-ETHXXX
MPC All-In-One
Computer
Medical Grade Power Supply
520-PSMPC1
541-NETQC1
QUICK DISCONNECT
HEADBOX

Hardware components for this system may vary to meet specific requirements. The information in this section describes the main components of the system. Some of these components are optional.

Amplifier module

See the illustrations on pages 14 and 15. The amplifier module (headbox) has input jacks for patient electrodes. It also contains the circuit boards necessary for amplifying, filtering, and analog-to-digital conversion of low-level EEG signals.

Computer

This software requires a Pentium III or Pentium IV, IBM-compatible system with a keyboard, 12 function keys, SVGA monitor, and internal disk drive(s). Typical disk drives include a 1.44MB floppy disk drive, a CD-ROM Drive, and a high capacity hard drive. Removable mass storage options include CD+R/W drives and DVD drives. This system also requires at least 512 MB RAM and Serial and Parallel I/O ports.

A/D Converter

All circuitry for converting analog signals to digital signals is inside the Amplifier module (headbox).

Printer (optional)

This optional device lets users print copies of program screens or reports. This software is compatible with most black and white or color inkjet or laser printers.

Mouse

The mouse is the primary input and control device for this software. It also serves as an alternative to the computer's keyboard.

Safety Standards

This system complies with these electrical safety standards:

- IEC 60601-1
- IEC60601-1-1
- IEC 60601-2-26
- UL 60601-1
- CAN/CSA C22.2 No. 601-1-M90

Structure and Organization

This section discusses three important and fundamental aspects of the structure and organization of an operating system: disk drives, files, and disk directories.

Drives

Most computers have disk drives that function as input or output devices. Users can move information (files) to memory from media on a disk drive or from memory to media on a disk drive for permanent storage. The names for drives on a computer follow a specific convention (usually consecutive letters of the alphabet).

Many computer systems have a floppy disk drive (Drive A☺. This is a 3.5" 1.44 MB disk drive. Systems also contain at least one internal hard drive (Drive C☺. Users can partition this drive into several depending on its size. Systems can support more than one internal hard drive. Users name partitioned drive segments, additional hard drives, or both according to sequential alphabetical order.

Other types of drives continue the alphabetical naming convention. For example, a system with a floppy drive, a hard drive, a CD-ROM Drive, a PCMCIA drive, and a DVD Drive might name the drives thus:

Floppy = A:
Hard drive = C:
CD-ROM drive = D:
PCMCIA drive = E
DVD drive = F

Other disk drives, including network drives, also continue to use the alphabetical naming convention depending on the number of physical devices attached to the system.

Files

The operating system lets you create, analyze, and manipulate information by storing data in "files." Files are the basic unit of organization and can contain either program code or information (data). Files reside on storage media or "disks" and have names that are unique to that disk. (That is, different files cannot be stored on the same disk under the same file name). Although two different files can be stored under the same name on different disks, it is a good idea to have unique file names for every file in your entire library. The file name extension designates the type of file. This extension is usually three characters long and follows the primary file name after a "period."

The table below lists valid and invalid file name characters.

Valid Characters:	A-Z 0-9 $ & # % ( ) @ ^ { } ~ ! _ (underline) - (dash or hyphen) ` (open single quotation) ' (apostrophe or closed single quotation)
Invalid Characters:	? . , ; : = * / \ + "

Some applications programs are more restrictive with regard to the valid character set. Some allow only eight-characters file names. Some create file names automatically. Most applications programs supply their own extension. For example, when specifying a data file in the Ceegraph program, you would not specify the file name extension. The program looks only to the primary file name. The Ceegraph program automatically appends the appropriate extension to all data file names.

Examples of file name extensions:

.EEG
.PAT
.EAD
.MRK
.OIT
.SPK
.MPG

Disk Directories or Folders

Disks with large storage capacities can contain a large number of files. The situation could be very confusing if you were unable to organize them within disk directories (folders) and subdirectories. Directories (or folders) serve as partitions for the storage of program and data files. With a directory structure, you can organize the files on a disk by type, application, class, or however you like. Further, you can organize the files in a directory within smaller subdirectories.

You can create a "branching structure" for your storage device by nesting directories within directories. Such a structure has different "levels." The top level of a directory structure is the "root" directory and is a property of all formatted disks, regardless of whether any directories have been created or not.

Think of directories and subdirectories as individual disks. If you list a directory listing from within a subdirectory, only the files in that subdirectory appear in the list. The number of bytes listed as available, though, refers to the space available on the entire disk, not just the space in the subdirectory or directory.

For comprehensive information about creating/removing directories, changing directories, accessing files that are not on the current directory or default drive, or other operating system instructions, consult the appropriate operating system manual.

System Application Software

Most companies send their customers new media (floppy disks or CD-ROM) that contain advances and enhancements in their program. This allows your system to be updated without factory modification. Although your system is based upon a personal computer, never access any other commercial programs while operating the CEEGraph or Sleepscan program. Other programs may interfere with their functionality.

Software Versions and Models

The model number of Bio-logic software depends on the type of computer that you ordered. In other words, the hardware of a Bio-logic system determines the model of software run on that system. In most cases, the user should NOT try to run a model of software on a system that did not originally come with the system.

The software version number indicates the age of the software. Typically, a program that is being created for the first time uses a whole version number such as 1.00. Each time the software is changed or updated a new version number applies to the software. For example, if the original version number of a program is version 1.00, the next update of the software might be numbered version 1.05.

Not all customers receive all versions of the software that a company creates. Many companies, including Bio-logic, have different "releases" of software. For example, many companies have an "Alpha" software release that may go only to company employees for testing. After that release and any modifications that occur, a company may

initiate a “Beta” release. In this release, selected customers receive the new program to test it for potential problems (bugs). The customers use the software extensively and report any bugs they find. Then, the company repairs the bugs and issues a “final” release for all of its customers. Each of these releases, the Alpha, Beta, and final release, has a separate version number.Bugs, Crashes, and Error Handling

A ‘bug’ is an error in the program that causes the system to do something other than what it should do. Note that a bug is only a bug if:

—The user has correctly entered the keystroke(s) needed to execute a function

and

—The system executes the function incorrectly.

Sometimes, a computer system may “lock up” (that is, get in a state where the system does nothing despite keystroke or mouse input). This condition is a crash. Typically, rebooting the system will correct this type of problem.

Bio-logic software lets you know when you have attempted to execute a function improperly or when the system is not ready to do what you have asked it to do. This is called error handling and it is usually accomplished by the flashing of error messages on the computer monitor or by having the computer emit a warning sound (beep) when an error has occurred. As an example, if you attempt to print to a printer that has its power turned off, the system lets the user know there is a problem by flashing some type of “PRINTER NOT READY” error message.

Software

This software application program works on IBM-compatible microcomputers with the Windows 98™, Windows 2000™, or Windows XP™ Operating System .

It uses the operating system as the underlying program that connects and controls the various components of the microcomputer system. Users can enter Windows 98/2000/XP commands to perform basic system functions (such as loading word processors or database programs). Users can also operate Windows software to copy data from disk to disk, to print data to an output device, or to run system maintenance programs (such as Scandisk and Defrag). For information about Windows 98/2000/XP functions, refer to Windows On-Line help.

This software application is currently available on CD-ROM. In addition to supplying software for analyzing and collecting patient data, Natus Medical Incorporated Also suppplies the entire Windows software library on CD-ROM.

Notes

Use this page for your own notes.

System specifications

This section lists the specifications of the Netlink or Netlink ICU system. Parts lists, circuit diagrams, and other maintenance and repair information is available on request from Natus Medical Incorporated

Data Acquisition

Number of channels for Netlink:	40 32 AC (isolated); 8 DC (non-isolated)
Number of channels for Netlink ICU:	26 22 AC (isolated); 4 DC (non-isolated)
A/D resolution:	22 bit; one A/D per channel
Sampling Rates:	256, 512, and 1024 per second

Signal Conditioning

Gain	Input range	Resolution	LSB used
19.07	2.62 mV	4 µV	16
19.07	1.31 mV	2 µV	17
19.07	0.65 mV	1 µV	18
19.07	0.32 mV	0.5 µV	19
190.7	26.2 mV	0.4 µV	16
190.7	13.1 mV	0.2 µV	17
190.7	06.5 mV	0.1 µV	18
190.7	03.2 mV	0.05 µV	19
DC	10 V	152 µV	16
DC	5 V	76 µV	17
DC	2.5 V	38 µV	18
DC	1.25 V	19 µV	19

Signal Conditioning (continued)

AC Channels for Netlink	32 24 referential inputs 8 bipolar or referential inputs
AC Channels for Netlink ICU	22 18 referential inputs 4 bipolar or referential inputs
DC Channels for Netlink	8 high level, non-isolated Input Range: +/- 5V Resolution: 38 µV at 18 bit
DC Channels for Netlink ICU	4 high level, non-isolated Input Range: +/- 5V Resolution: 38 µV at 18 bit
Notch Filter	50/60 Hz Software digital filter
High Pass Filters	0.01 Hz or 0.1 Hz, software controlled with cutoff of 6dB per octave, 1 pole
Low Pass Filters	570 Hz and 100 Hz 1 pole (in hardware) 12-18 dB per octave (2-3 pole) cutoff done digitally in software
Input Impedance	>100 M ohm or more on isolated EEG channels
CMRR	>100 or better (typically, 110 dB on isolated EEG channels)
Noise Level	0.5 µV rms (0.1-100 Hz) on isolated EEG channels

Calibration

Signal type	Sine wave, Square wave, DC step
Test signal frequency	0.5 Hz thru 20 KHz
Test signal amplitude	100m, 50m, 10m, 5m, 1m 500µ, 100µ, and 50µ Vpp

Impedance test

Signal type	Sine wave; constant current source
Test signal frequency	10 Hz to 20 Hz
Range	0-131 K Ohms at 2 µApp, 262 K Ohms at 1 µApp
Resolution	< 100 Ohms
Impedance Pass/Fail	LED display per channel

Computer

Processor	Pentium III or higher
Memory	512 MB RAM
Keyboard	Detachable 101-key; 12 Function keys
I/O	Parallel port; Serial ports
Mouse	For optional program control
Operating System	Windows 98/2000/XP™

Storage

Floppy disk	1.44 MB
Hard Disk	40 GB or more
Other storage devices	CD ROM, DVD-RAM; CD+R/W

Display Options

17” screen Ultra-high Resolution 1600 x 1200 (optional)

20” screen Ultra-high Resolution 1600 x 1200 (optional)

Printers

Laser; Color inkjet

Physical

Computer	Tower 17 cm W x 45 cm H x 43 cm D	Desktop 45 cm W x 17 cm H x 43 cm D
Netlink	7” W x 2.5” H x 10” D	

Amplification features

Internal calibration and impedance test
Built-in self test and system diagnostic capability
Automatic sensing of headbox connect/disconnect
All parameters operate under software control

Options and Accessories

Photic Stimulator	**Support arm**	52 in. (1320.8 mm) total
	Frequency of flash	Variable from 1Hz to 60 Hz
	Light intensity	Adjustable via Intensity control
	Accessory Receptacles	115VAC 50/60Hz, 750VA max. (all loads combined)
	Mains Input	115/230VAC 50/60Hz, 780VA
	Replacement Fuses	Rating: 100-120V – T8AL 250 V (two fuses required) 220-240V – T4AL 250 V (two fuses required)
Body position monitoring	Generates an unique 4-bit code read on 4 data input pins of 4 analog-to-digital converters Input connector: 3-pin Plastics One™ connector One pin indicates connection	
Oximeter	Plugs into digital board Reads data on serial port EMI filtering for inputs and outputs See the Oximeter section of this manual for details.	
Pushbutton controls	Start and stop collection; Start and stop impedance test pushbuttons	

Power 200 Watts, 50/60 Hz, 120/240 Volts (Auto Switching)

Operating Temperature 15-30º C
59-86º F

STANDARDS IEC 60601-1

IEC60601-1-1

IEC 60601-2-26

UL 60601-1

CAN/CSA C22.2 No. 601-1-M90

Oximeter

Oxygen saturation range	0-100%
Pulse rate range	18 – 300 pulses per minute
Accuracy SpO_2	70-100% ±2 digits for adults using a fingertip sensor
(±1 standard deviation)	70-100% ±3 digits for neonates using infant or neonatal sensors
	70-100% ±3 digits for adults using Flex or Reflectance sensors
	70-100% ±4 digits using earclip sensors
Rate accuracy	±3 %; ±1 digit
Patient isolation	Greater than 12 megohm
Dimensions	34.5 x 46 x 9 mm 1.35” x 1.8” x 0.36”
Weight	12 g

For more information about the Oximeter printed circuit board, make contact with:

Nonin Medical, Inc.
2605 Fernbrook Lane North
Plymouth, MN 55447-4755
1-800-356-8874

Isolation Transformer

Isolation Transformer is used only when a Medical Grade Power Supply is not used. Refer to Isolation Transfomer User’s and Service Manual 590-ISOXM1 for specifications and use.

Notes

Use this page for your own notes.

INSTALLATION, DISASSEMBLY, ASSEMBLY

Customization and configurations

Bio-logic computer systems have a custom configuration. This customization is not only in the software installed but in the network configuration as well. In some cases these computers will have one network interface card (NIC) and in other cases there will be two NIC's. The customized settings are critical to the proper functioning of the system.

In a **single** NIC configuration, the card is used to communicate with other Bio-logic computer systems. In the **dual** NIC configuration one card is used to communicate with other Bio-logic computer systems as in the single NIC configuration and the other NIC is used to communicate with the amplifier. TCP/IP is the only protocol used by Bio-logic computer systems. All NIC's will have static IP addresses assigned to them and have no need for WINS, DNS, or host file name resolution. The only other network components necessary are file and print sharing, and client for Microsoft networks. On a dual NIC configuration the network card being used to communicate with the amplifier must only have the protocol bound.

Three IP addressing ranges or subnets are used by Bio-logic equipment for communication.

- For communication between computers the subnet used is 192.168.064.000.
- For communication between computers and XL amplifiers is 207.227.127.000
- For communication with Netlink or Netlink ICU amplifiers are 192.168.072.000.

Only two addresses are used in each of the amplifier subnets.

- The amplifier will always have an address of xxx.xxx.xxx.29.
- The NIC used to communicate with the amplifier will always have an address of xxx.xxx.xxx.30.

On the subnet used for communication between computers, the number of addresses in use is determined by the number of machines on the network with the collector computer addresses beginning with 192.168.64.01, the reader computer addresses beginning at 192.168.64.101 and laptop addresses beginning at 192.168.64.201.

All Bio-logic computer workstations are configured with two partitions on a single physical disk. The extended partition has one logical partition which is where all the data is stored. The DVD RAM drive is used for data archiving. Each computer will have two network shares configured, the data partition and the DVD RAM drive. These shares must be setup to allow all users full access. This will not affect the data security on the facility or Bio-logic LAN as Bio-logic computers should be on an isolated network. These shares are vital as the software makes use of them. Bio-logic also makes several other less obvious modifications to the operating system. Each of these modifications is designed to enhance the performance of the system and our software.

User accounts and privileges need to be considered when using Windows NT 4.0 and Windows 2000 Professional, with the end user having a logon with administrative privileges on the local machine. This level of privileges is needed to update the software as they become available and for some of the software features to function. Our technicians configure the local administrator account with a password known only to Bio-logic personnel. An account with local administrative privilege is a critical tool for our support personnel to use when supporting these systems. For these reasons, it is vital that the password not be changed, except by a Bio-logic employee.

Important for Bio-logic computers on the facility network:

- Our systems are configured to ignore the daylight saving time updates. If network time is being given to the client systems in any way that can affect the time settings on our systems. For this reason it is important that no Bio-logic computer has its time given to it by the network.
- Third party applications can have negative effects on the performance of our software especially on the systems that are used for patient data collection. Due to the performance impact, non Bio-logic approved applications must not be installed on our systems either manually or through an automated process.
- Just as third party applications affect the performance of our software so does the use of screen savers. Therefore, we recommend turning off the monitor to comply with HIPPA.

Natus Medical Incorporated Has a knowledgeable and well-trained staff capable of supporting not only the software but the PC's and networks as well. If you have any questions please feel free to contact a customer support specialist at (800) 323-8326, or email any questions to support@Bio-logic.com.

Instructions

WARNING

Before you begin ANY installation, disassembly, or assembly procedure, make sure that you read the PRECAUTIONS AND SAFETY INSTRUCTIONS section of this manual thoroughly. Be certain that you understand all of the information in that section and that you follow all of the instructions in it.

As part of the purchase of a Netlink or Netlink ICU system, Bio-logic offers a one-time installation. If you decide to move, re-install, return, or otherwise disassemble or reassemble your system, you must follow the instructions in this section to disassemble or assemble the Netlink and Netlink ICU system for optimal use.

Disassembly for storage or return—general instructions

This section presents general instructions for disassembling your Netlink and Netlink ICU system. Specific installation instructions—including assembly procedures—follow. For detailed disassembly procedures, reverse the assembly steps. That is, start at the final step and follow them in reverse order; substitute "unscrew" for "screw," unplug" for "plug," and so on.

Handle the system carefully during disassembly for storage or return If problems arise at any point, stop the process immediately and make contact with Natus Medical Incorporated Customer Support at 1-800-303-0306. Follow these general steps:

1. Return all controls to their original positions.
2. Turn off all system equipment.
3. Remove all connecting cables carefully without using force.
4. Follow designated hospital procedures to clean the equipment and its electrodes
5. Store the equipment according to the environmental specifications in this document.

   OR

6. Repack the original carton with only the defective equipment; use the same packing material to make sure the product is not damaged.

Note: Damaged material is not covered under First Year Warranty or Service Contracts. Returning damaged material will result in an invoice for the full retail price of the damaged part.

7. Make sure a specific Reference Number is visible on the outside of the carton.
8. Seal the carton and return to its original delivery address for pickup by UPS.

Note: When you package printers for storage or return, make sure that you remove ink or toner cartridges.

WARNING

Never use equipment that has parts missing or equipment that might contain loose parts inside of it (that is, inside an enclosed portion of the equipment). If you suspect a piece of equipment has missing or loose parts, make contact with Bio-logic System Corp

The return process normally takes ten (10) business days. If Bio-logic does not receive the defective item within this time span, an invoice will be issued for the full retail price along with any applicable shipping charges. These invoices will be issued regardless of First Year Warranty or Service Contract status.

Bio-logic will only issue UPS Call Tags once. If you miss all attempts by UPS to pick-up the replaced product, you may return it to Bio-logic at your expense. These returns must be received at Bio-logic within ten business days of your receipt of requested exchange product. Bio-logic also offers UPS ARS (Automated Return Service) labels upon request.

If you have any questions or comments regarding this policy, or if anything unexpected occurs that affects this procedure, please make contact with us at 800-323-8326, ext. 222.

Unpacking and Assembly

1. Count the cartons. Verify that the entire shipment is there.

2. Verify contents against packing slip.
   The packing slip is in carton one.

3. Unpack the boxes by system, one system at a time.

4. Examine Installer Package in Box 1.
   Networking information is in the Installer Package.

5. Check for damaged equipment.

   IF DAMAGE TO THE CONTENTS HAS OCCURRED

   —Keep all damaged cartons and packing for investigation by the carrier.

   —Make contact with Bio-logic to request a replacement system(s) and/or accessories and to notify carrier.

6. After assembly and testing, complete the Installation Report (F09.025) on each system.

7. Review backorder lists and information from Natus Medical Incorporated Customer Support.

8. Check all packing material to ensure that nothing is accidentally thrown away.

Installer Package Documentation

The following documentation is in the Installer Package. The Installer Package is inside the Natus Medical Incorporated Boxes.

—**Installation & Inspection Form F09.002** – This form confirms a system inspection, system functionality, and system verification. Installation personnel should complete it for each individual system.

—Collection & Analysis Quick Guides – Included for Training and customer reference

—Security Block Information – This sheet defines the system security block.

—Supplies and Accessories Questionnaire

Optional Parts List

Part Number	Description
520-PS5V5A	Power Supply, 5V, 5A 100-240V input
520-PSMPC1	Medical Power Supply, 20V, 9A, 100-250V input
541-CORD12	HGPS CORD, 12 FT, 16/3 SJT, UL/CSA AP
541-ETH006	CABLE, ETHERNET, CAT5, 100MHZ, 6'
541-ETH010	CABLE, ETHERNET, CAT5, 100MHZ, 10'
541-ETH015	CABLE, ETHERNET, CAT5, 100MHZ, 15'
541-ETH025	CABLE, ETHERNET, CAT5, 100MHZ, 25'
541-ETH050	CABLE, ETHER, CAT5, STRAIGHT, 50'
541-ETH100	CABLE, ETHERNET, CAT5, 100MHZ, 100'
541-NETPHO	CABLE, SUB-ASSY, NETLINK PHOTIC STI
541-NETQC1-006	CABLE, NETLINK TO QUICK DISCONNECT, 6'
541-NETQC1-025	CABLE, NETLINK TO QUICK DISCONNECT, 25'
550-WRCLP1	CABLE ROUTING, 1.44 DIA TWIST-LOCK
575-CMSBBX	BRACKET-SLIDE, BOX MOUNT
575-CMSBMT	BRACKET-SLIDE, HOLDER
577-8000AA	FINGER CLIP SENSOR, NONIN 8000AA
577-BELT01	BELT,ADJUSTABLE,SNAP BCKL,2
577-POUCH6	POUCH,F/32CH QDH,DISPOSABLE, BLK W/
580-AIRPS3	CABLE, AIR PRESSURE TRANSDUCER W/RJ

Part Number	Description
580-AIRPS5	CABLE, AIR PRES TO HYPERTRONICS FEM
580-AIRPS9	ASSEMBLY, AIR PRESSURE TRANSDUCER
580-AIRPSK	KIT,AIR PRESSOR SENSOR,SENSOR & ACC
580-CG2PG1	ASSEMBLY, CABLE/INTERFACE, FOR 580-
580-CG2PGR	ASSEMBLY, CEEGRAPH TO VISIPLEX PAGE
580-CG2TEL	INTERFACE ASSEMBLY, CEEGRAPH TO TEL
580-CG2TL2	PCB ASSY, DB-37 CIRCUIT, CEEGRAPH T
580-CGAUX1	CABLE,GAMMA AUX PAT INPUT,16CH,HOND
580-G2CGDC	NETLINK HEADBOX, NO OXI, W/DC
580-G2CGSS	NETLINK HEADBOX, W/OXI, W/DC
580-MOUSEP	MOUSEPAD W/BLCS LOGO
580-NELCBL	CABLE, NELLCOR OXIMETER TO CEEGRAPH
580-NELCBL-040	OXIMETER TO CEEGRAPH, 40FT, NELLCOR
580-NELCBL-070	OXIMETER TO CEEGRAPH, 70FT, NELLCOR
580-NETOX1-010	OXIMETER INTF, 3.5-3.5mm PLUG 10FT
580-NETOX1-025	OXIMETER INTF, 3.5-3.5mm PLUG 25FT
580-NETOX1-050	OXIMETER INTF, 3.5-3.5mm PLUG 50FT
580-NETOX1-075	OXIMETER INTF, 3.5-3.5mm PLUG 75FT
580-NETOX1-100	OXIMETER INTF, 3.5-3.5mm PLUG 100FT
580-NETOX1-125	OXIMETER INTF, 3.5-3.5mm PLUG 125FT
580-NETOX1-150	OXIMETER INTF, 3.5-3.5mm PLUG 150FT
580-NETOX1-175	OXIMETER INTF, 3.5-3.5mm PLUG 175FT
580-NETOX1-200	OXIMETER INTF, 3.5-3.5mm PLUG 200FT
580-NETOX2-010	OXIMETER INTF, 3.5mm-3/32 PLUG 10FT
580-NETOX2-025	OXIMETER INTF, 3.5mm-3/32 PLUG 25FT
580-NETOX2-050	OXIMETER INTF, 3.5mm-3/32 PLUG 50FT
580-NETOX2-075	OXIMETER INTF, 3.5mm-3/32 PLUG 75FT
580-NETOX2-100	OXIMETER INT, 3.5mm-3/32 PLUG 100FT

Part Number	Description
580-NETOX2-125	OXIMETER INT, 3.5mm-3/32 PLUG 125FT
580-NETOX2-150	OXIMETER INT, 3.5mm-3/32 PLUG 150FT
580-NETOX2-175	OXIMETER INT, 3.5mm-3/32 PLUG 175FT
580-NETOX2-200	OXIMETER INT, 3.5mm-3/32 PLUG 200FT
580-NETOX3-010	OXIMETER INTF, 3.5mm PLUG-BNC 10FT
580-NETOX3-025	OXIMETER INTF, 3.5mm PLUG-BNC 25FT
580-NETOX3-050	OXIMETER INTF, 3.5mm PLUG-BNC 50FT
580-NETOX3-075	OXIMETER INTF, 3.5mm PLUG-BNC 75FT
580-NETOX3-100	OXIMETER INTF, 3.5mm PLUG-BNC 100FT
580-NETOX3-125	OXIMETER INTF, 3.5mm PLUG-BNC 125FT
580-NETOX3-150	OXIMETER INTF, 3.5mm PLUG-BNC 150FT
580-NETOX3-175	OXIMETER INTF, 3.5mm PLUG-BNC 175FT
580-NETOX3-200	OXIMETER INTF, 3.5mm PLUG-BNC 200FT
580-NETOX4-010	OXIMETER INTF, 3.5mm PLUG-DB9 10FT
580-NETOX4-025	OXIMETER INTF, 3.5mm PLUG-DB9 25FT
580-NETOX4-050	OXIMETER INTF, 3.5mm PLUG-DB9 50FT
580-NETOX4-075	OXIMETER INTF, 3.5mm PLUG-DB9 75FT
580-NETOX4-100	OXIMETER INTF, 3.5mm PLUG-DB9 100FT
580-NETOX4-125	OXIMETER INTF, 3.5mm PLUG-DB9 125FT
580-NETOX4-150	OXIMETER INTF, 3.5mm PLUG-DB9 150FT
580-NETOX4-175	OXIMETER INTF, 3.5mm PLUG-DB9 175FT
580-NETOX4-200	OXIMETER INTF, 3.5mm PLUG-DB9 200FT
580-NETOX5-010	OXIMETER INTF, 3.5mm-RCA PLUG 10FT
580-NETOX5-025	OXIMETER INTF, 3.5mm-RCA PLUG 25FT
580-NETOX5-050	OXIMETER INTF, 3.5mm-RCA PLUG 50FT
580-NETOX5-075	OXIMETER INTF, 3.5mm-RCA PLUG 75FT
580-NETOX5-100	OXIMETER INTF, 3.5mm-RCA PLUG 100FT
580-NETOX5-125	OXIMETER INTF, 3.5mm-RCA PLUG 125FT
580-NETOX5-150	OXIMETER INTF, 3.5mm-RCA PLUG 150FT

Part Number	Description
580-NETOX5-175	OXIMETER INTF, 3.5mm-RCA PLUG 175FT
580-NETOX5-200	OXIMETER INTF, 3.5mm-RCA PLUG 200FT
580-NETOX6-006	(4) 3.5mm PHONE PLUG TO RJ45 6 FT.
580-NETOX6-012	(4) 3.5mm PHONE PLUG TO RJ45 12 FT.
580-NETOX7-100	CABLE, MASIMO OXIMETER TO NETLINK
580-NETPBT	PUSH BUTTON, EVENT (NETLINK)
580-NETPHO-002	CABLE, ASSEMBLY, 18
580-NETPHO-025	CABLE, ASSEMBLY, 25ft NETLINK PHOTI
580-NLICU1	NETLINK ICU HEADBOX, W/OXI, W/DC
580-NLICU2	NETLINK ICU HEADBOX, NO OXI, W/DC
580-QCBG2A	MODULE ASM, QUICK CONNECT, NETLINK
580-QDH32G	BOX,QUICK DISCONN.,32CH,PIVOTING CO
580-XFS751	TESTED, ASM XFMR SA 120V 750VA
580-XFS752	TESTED, ASM XFMR SA 240V 750VA
585-CAMMT2	POLE-CAMERA MTG, TELESCOPING FOR NE
585-CDREX7	CDRW, external, LTR-52246S black
585-CDRIN7	CDRW, Internal, LTR-52246S Black
585-CMB002	Battery; CPAQ P4
585-CPSY11	Power Supply for CPAQ P4 DT/TWR
585-CPSY12	Power Supply, HP Vectra VL420 Tower
585-DPRT03	HP DJ MODEL 960cxi PRINTER
585-ETHPR1	Intel Ether Pro/100 NIC Adapter
585-ETHPR2	Intel Ether Pro/1000 GB Adapter
585-ETHS03	Ethernet Switch, 8-Port GB Switch
585-FAN101-001	PENTIUM HEATSINC W/MOLEX AT PWR
585-FAN104	Fan, Proc. Fan/Heat Sinc
585-FLOP03	Disk Drive CPAQ EVO D510
585-G2CAD0	TELESCP ROLL STAND CART, CPU TWR,NO
585-G2CADY	TELESCP ROLL STAND CART, CPU TWR W/

Part Number	Description
585-G2NTBK	TELESCP ROLL STAND CART, NOTEBOOK C
585-G2PHOT	ROLL STAND CART, PHOTIC LAMP & HEAD
585-G2WLMT	NETLINK HEADBOX WALL MOUNT, VERT ADJUSTABLE
585-HDI030	Hard Drive, 80 GB, Maxtor
585-HDI031	Hard Drive, 250GB, Maxtor
585-KBD007	Keyboard, COMPAQ P4 EVO D510
585-LFD212	DVD-RAM,9.4GB,Multi-D,Panasonic
585-LPRT05	Printer, Laser, Lexmark E323
585-MON010	20 flat w/spk. model VP201m black
585-MON011	17 NEC MultiSync LCD 1760V Black
585-MONO12	19 Viewsonic LCD Blk. Monitor
585-MOUS16	Mouse, 2-Button Scroll PS/2, Black
585-NETBPS	SENSOR, BODY POSITION FOR NETLINK
585-NETBPS-1	SENSOR, BODY POSITION FOR NETLINK
585-SW9571	DVD-RAM, 9.4GB, MULTI-D, PANASONIC
585-TLYCT0	TROLLEY-CEEGRAPH, W/OUT VIDEO
585-TLYCT1	TROLLEY-CEEGRAPH, W/VIDEO
590-G2CADY	ASSEM, CART 585-G2CADY & 585-G2CAD0
590-G2NTBK	ASSEM, CART 585-G2NTBK
590-G2PHOT	INSTALLATION FOR 585-G2PHOT CART
590-G2WLMT	INSTALL, WALL MOUNT FOR HEAD BOX
590-NETSM1	COVER INSERT, NETLINK SRV MANUAL

Cart Assembly

Netlink Carts

Detailed Assembly directions on the Netlink carts appear in these documents:

Netlink and Netlink ICU Tower Computer Cart 585-G2CADY-Rev B (with and without video)

Netlink and Netlink ICU Notebook Computer Roll Stand Cart 590-G2NTBK-Rev B

We duplicate those documents here for your convenience.

— *Assembly Instructions for the Netlink Tower Computer Cart 585-G2CADY (with video) and 585-G2CAD0 (without video)*

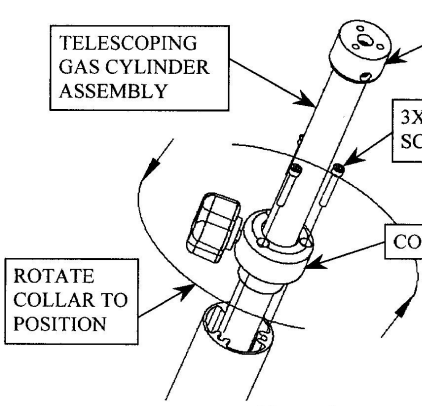


Figure 1

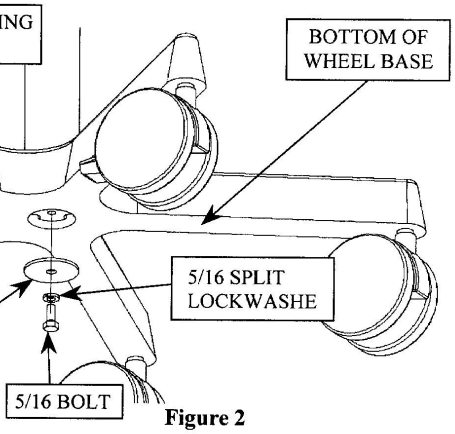


Figure 2

To change the orientation of the tightening knob <u>on new carts with fixed (non-rotational) gas cylinders</u> to the left-rear side: 1- Remove the (3) 1/4-20 Cap Screws per **Figure 1** with an Allen wrench. 2- Rotate the collar (**Figure 1**) to the orientation shown in **Figure 3**. ***(Note that the 3 holes on the top of the telescoping section are .75" in one direction and .70" in the other. The .7" dimension must be front to back with the (2) holes, .75" apart, at the front***. *The knob has 3 possible positions at 120° increments.* 3- Reseat the collar and replace the (3) Cap Screws securely.

Assemble the Gas Cylinder to the wheel base. Orient the cylinder so that the tightening knob is to the left-rear side and the wheel base has two legs to the front as shown in **Figure 3**. Orient the base so that the brake wheels are (1) to the rear, and (1) to the left-front or right front. Insert the 5/16 bolt from the bottom with the large flat washer against the base and the lock washer next, **Figure 2**. Using an adjustable wrench, tighten the bolt until the bottom tapered section at the bottom of the cylinder is completely within the base. *(You may want to use the "W" Swivel Mount Bracket to gage the straightness, and that the hole orientation is correct so far before tightening the bolt completely).*

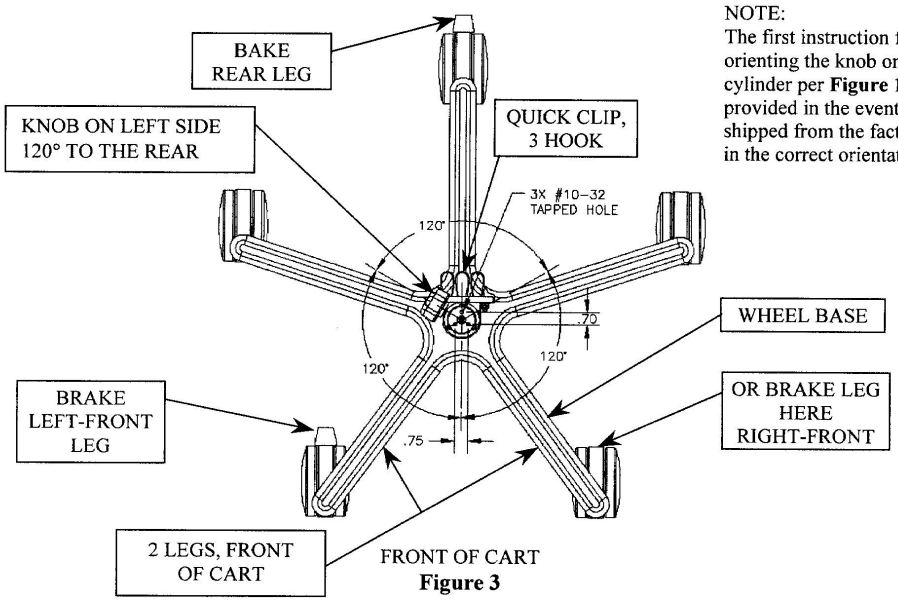


Figure 3

NOTE:
The first instruction for orienting the knob on the gas cylinder per **Figure 1** are provided in the event that that shipped from the factory is not in the correct orientation.

GENERAL NOTE:
LOOK FOR ALLEN WRENCHES AND HARDWARE WHICH ARE TAPED TO VARIOUS PIECES OF THE CART.

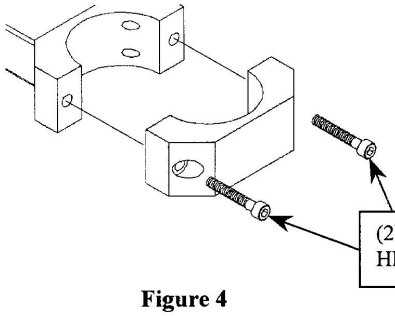


Figure 4

TYPICAL CLAMP ARRANGEMENT

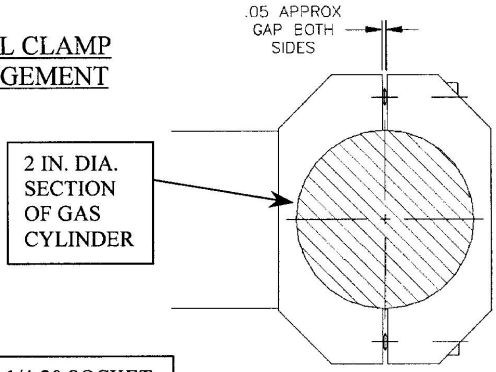


Figure 5

Shown above, **Figure 4 & 5** is the typical clamping method used for mounting the cart components onto the 2-inch diameter section of the gas cylinder in the following steps. A 3/16 "Allen" wrench is supplied with the cart. When tightening the screws, tighten one end so it has a gap as shown in **Figure 5.** Then tighten the other side. When completely tightened, the gap should be approximately equal on both sides.

Install the Quick clip approximately 10 inches up from the top of the wheel base with the 3 loops facing the back per **Figure 3, 6 & 7**. Tighten with a Phillips screwdriver.

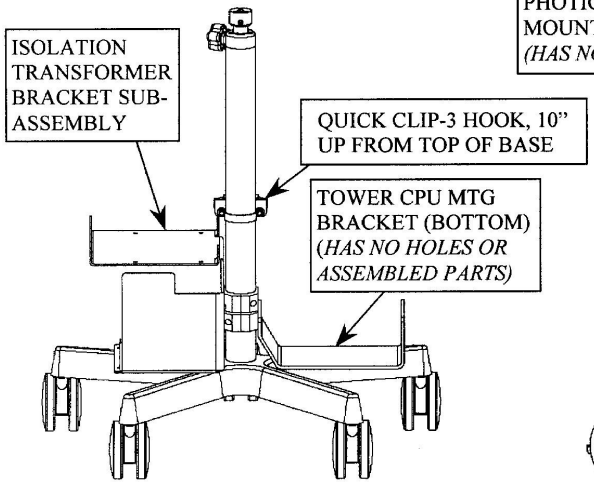

ISOLATION TRANSFORMER BRACKET SUB-ASSEMBLY
QUICK CLIP-3 HOOK, 10" UP FROM TOP OF BASE
TOWER CPU MTG BRACKET (BOTTOM) (HAS NO HOLES OR ASSEMBLED PARTS)

Figure 6

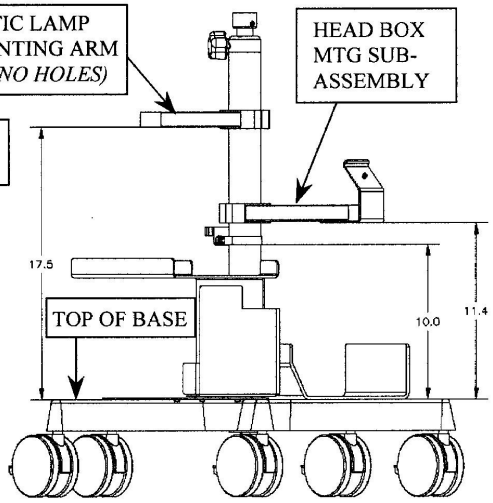


Figure 7

Mount the Tower CPU bracket assembly at the bottom ***first,*** as shown in **Figure 6** using the supplied "Allen wrench". Orient it to the right side, **Figure 8**, and so that it is just touching the top of the wheel base. Be sure it is level, not cocked up or down. Tighten the clamp securely.

Next, mount the Isolation transformer bracket sub-assembly to the left side opposite the CPU bracket and also just touching the top of base, **Figure 6, 7 & 8**.

The Photic lamp mounting arm and Netlink head box mounting sub-assembly should be mounted to approximately the recommended heights, **Figure 7** and orientation in **Figure 8**.

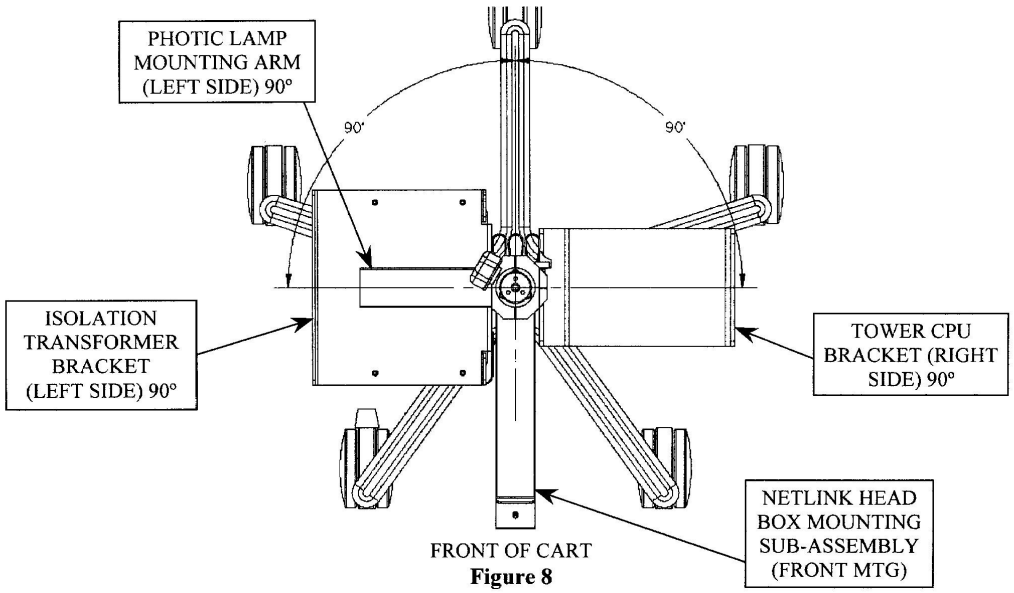

PHOTIC LAMP MOUNTING ARM (LEFT SIDE) 90°
90°
90°
ISOLATION TRANSFORMER BRACKET (LEFT SIDE) 90°
TOWER CPU BRACKET (RIGHT SIDE) 90°
NETLINK HEAD BOX MOUNTING SUB-ASSEMBLY (FRONT MTG)
FRONT OF CART

Figure 8

Place the Tower computer into the lower CPU bracket centered from front to back. Next, place the CPU mounting bracket (TOP) over the computer and clamp it into place, **Figure 9**. NOTE: *This bracket has mounting holes for the basket and telescoping camera mount. (If the computer is not available at this time, set up the space between the upper and lower CPU bracket to at approximately 18-19 inches).*

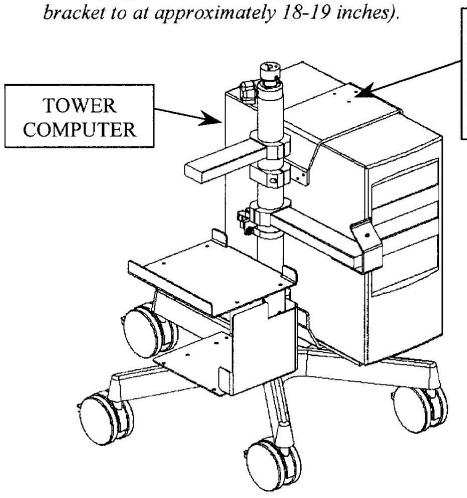


Figure 9

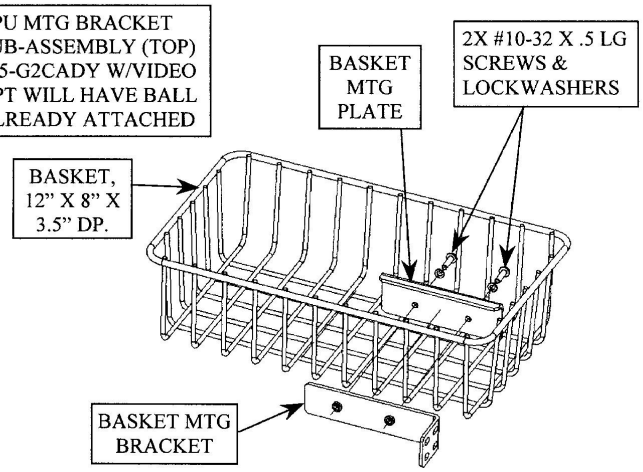


Figure 10

BASKET ASSEMBLY: Parts necessary for mounting the basket are shown in **Figure 10**. There are two mounting options for the basket, rear and front. Refer to **Figure 21** for an overview of how each option will look. *For front mounted baskets, the Netlink head box mounting arm must be oriented per **Figure 14 & 15.*** Assemble the brackets to the basket approx. 1/4" beyond the top ring, **Figure 11,** and up against the top ring per **Figure 12** sandwiching the basket wire between the bracket and the plate. For front mounting, assemble brackets on opposite side per **Figure 11**.

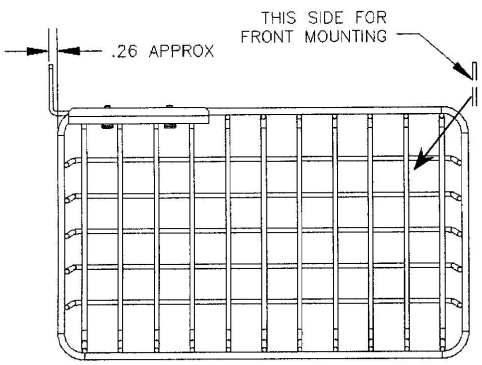
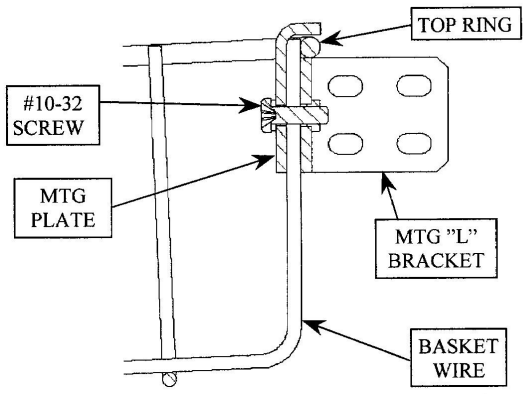
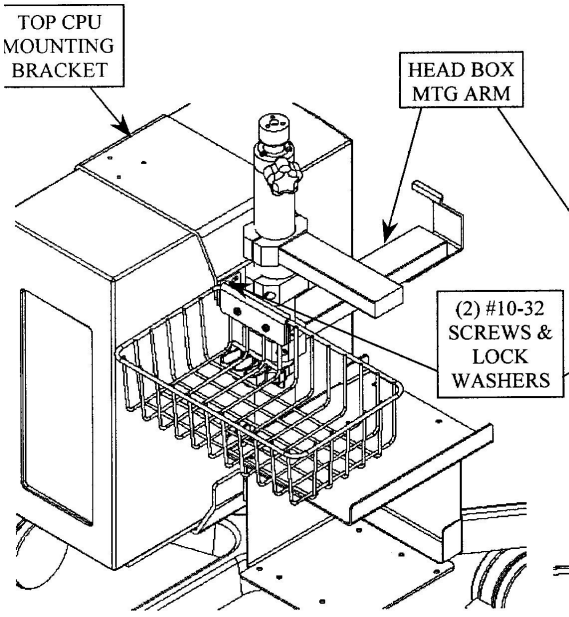


Figure 11



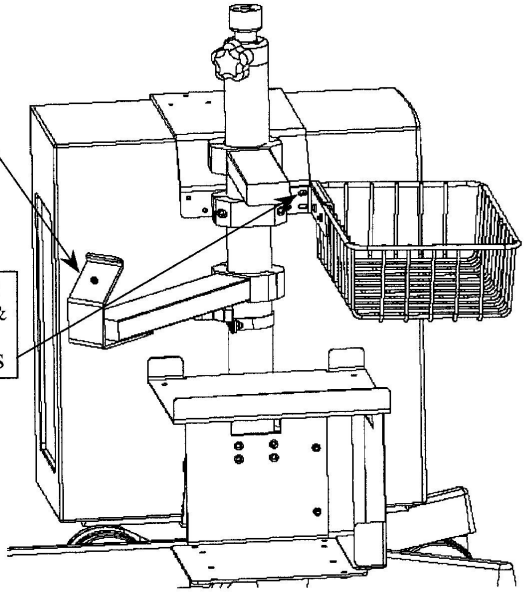
REAR BASKET MOUNTING SET UP SHOWN

Figure 12



REAR MOUNTED BASKET

Figure 13



FRONT MOUNTED BASKET

Figure 14

Mount the basket to the Top CPU mounting bracket for front or rear mounted basket with (2) #10-32 Phillips screws & split lock washers supplied. Please note that the Head box mounting arm must be oriented to the front for rear mounted basket, and approximately 45° to the rear per **Figure 15** for the front mounted basket.

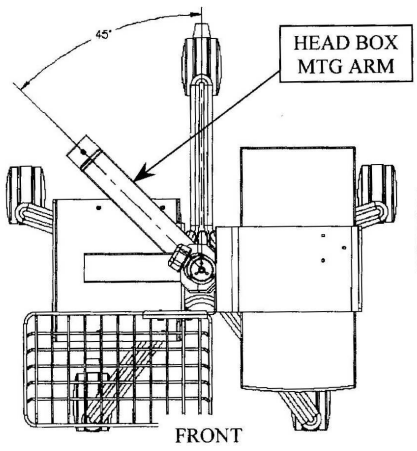


Figure 15

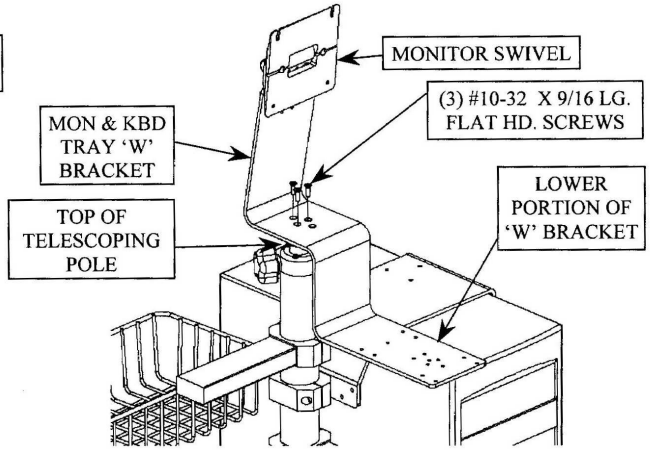


Figure 16

Mount the Monitor and Keyboard tray 'W' bracket to the top of the telescoping pole with (3) #10-32 X 9/16" Lg. Flat Head Phillips screws supplied. See **Figure 16**. Orient the bracket so that the lower portion faces the front. Line up the holes in the 'W' bracket as shown in **Figure 16** with those at the top of the telescoping pole before fastening. These should line up properly if the orientation is correct per step 1. *(On older carts, the telescoping pole rotates freely in which case it will be necessary to rotate the pole until the 3 holes line up).*

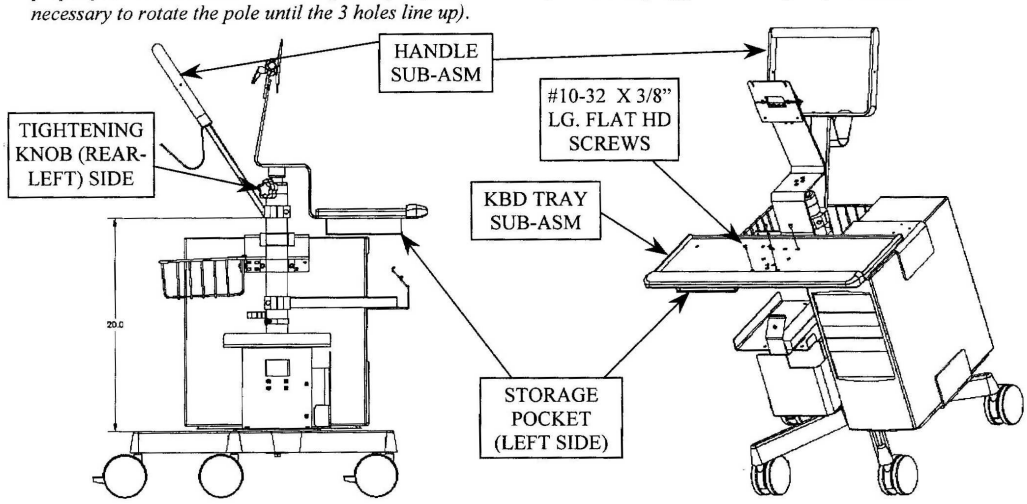


Figure 17

Figure 18

Assemble the Handle to the cart per the height dimension in **Figure 17**. *Do not mount too close to the tightening knob (left-rear) that there isn't enough room to grip the knob.* The handle to be parallel to and above the rear leg.

Next, mount the Keyboard tray to the lower portion of the 'W' bracket with (4) #10-32 flat head Phillips screws supplied per **Figure 18**. The storage pocket should be pre-assembled to the keyboard tray on the left side with the opening facing the front. There are 2 sets of holes so the Keyboard tray can be located 1" more forward or back.

The cart itself is now complete for 585-G2CAD0 (for systems without video).

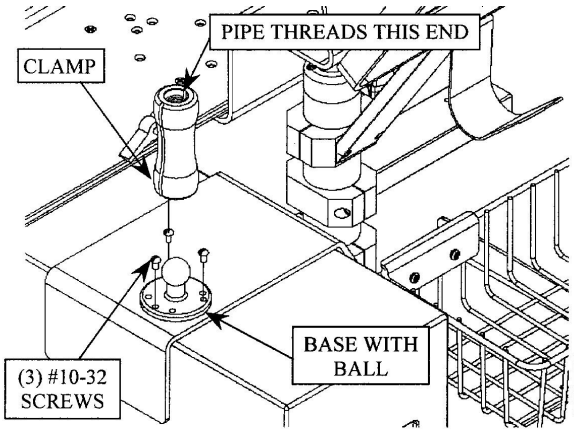


Figure 19

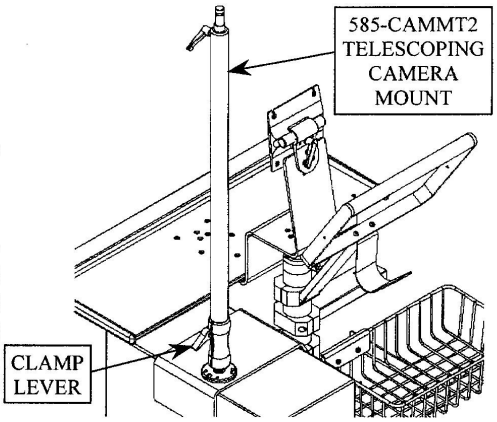
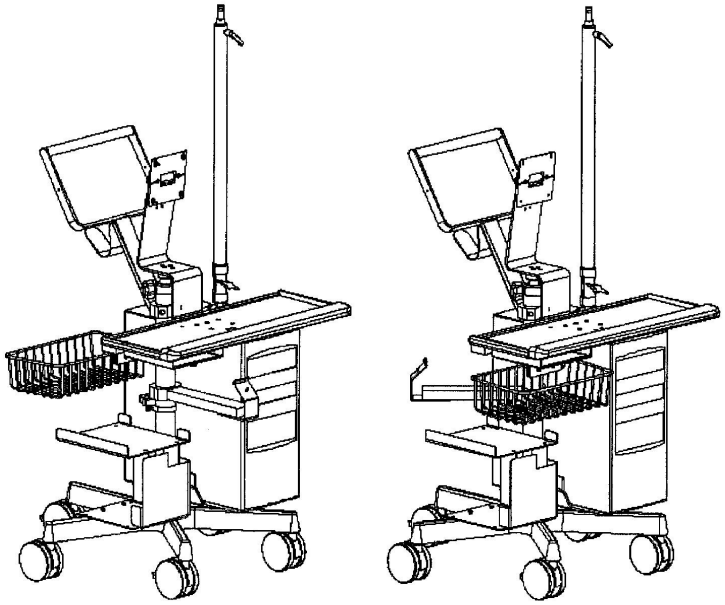


Figure 20

For 585-G2CAD0 (without video option), assemble the Telescoping camera mount **Base** with (3) #10-32 Screws per **Figure 19**. Line up three holes in the base with those in the Top CPU bracket. Apply the camera mount by opening the clamp so that it fits over the ball, and then tighten to the desired position as shown in **Figure 19 & 20.** (*Camera mount is P/N 585-CAMMT2 if purchased separately as an upgrade).*

For 585-G2CADY (with video option), the base with ball and clamp should already be assembled to the bracket. In either case, it will be necessary to thread the telescoping camera mount pole into the pipe threads in the clamp.



REAR MOUNTED BASKET **FRONT MOUNTED BASKET**

Figure 21

Completed cart assembly with front or rear basket mounting options shown in **Figure 21**.

— *Assembly Instructions for the Netlink Notebook Computer Roll Stand Cart (585-G2NTBK)*

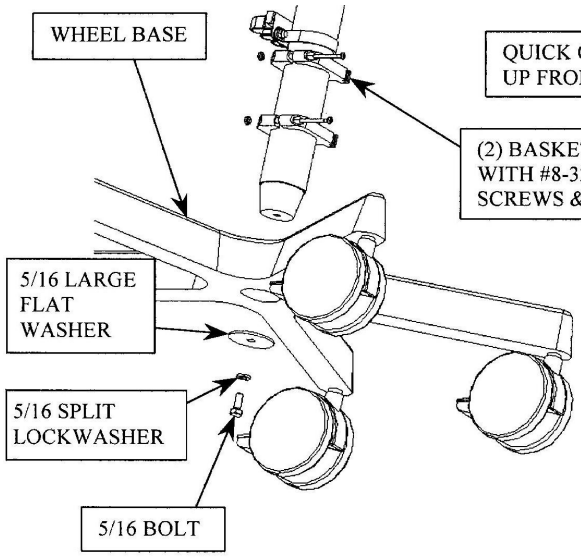


Figure 1

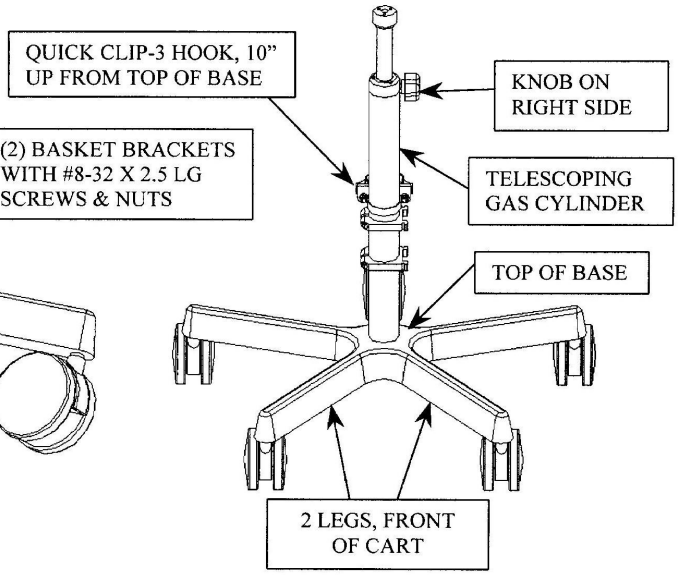

QUICK CLIP-3 HOOK, 10" UP FROM TOP OF BASE
(2) BASKET BRACKETS WITH #8-32 X 2.5 LG SCREWS & NUTS
KNOB ON RIGHT SIDE
TELESCOPING GAS CYLINDER
TOP OF BASE
2 LEGS, FRONT OF CART

Figure 2

Place (2) basket brackets onto the shaft from the bottom ***first***, making sure the solid side is facing upward. Then assemble the gas cylinder to the wheel base. Orient the cylinder so that the tightening knob is to the right and the wheel base has two legs to the front as shown in **Figure 2**. Insert the 5/16 bolt from the bottom with the large flat washer against the base and the lock washer next, **Figure 1**. Using an adjustable wrench, tighten the bolt until the bottom tapered section at the bottom of the cylinder is completely within the base.

Install the Quick clip approx. 10" up from the top of the wheel base with the 3 loops facing the back above the basket brackets. See **Figure 5** for height dimensions. Tighten with a Phillips screwdriver enough that it stays on.

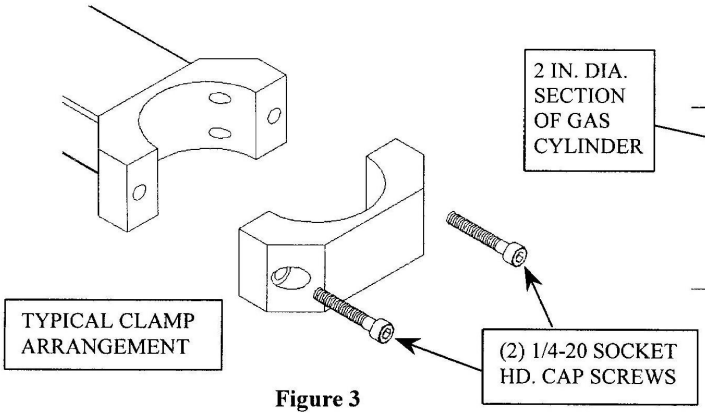


Figure 3

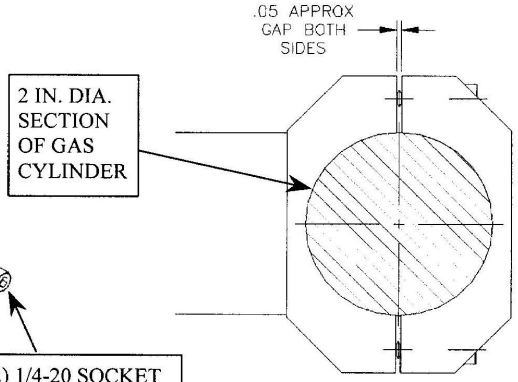


Figure 4

Shown above, **Figure 3 & 4** is the typical clamping method used for mounting the cart components onto the 2-inch diameter section of the gas cylinder in the following steps. A 3/16 "Allan" wrench is supplied with the cart. When tightening the screws, tighten one end so it has a gap as shown in **Figure 4.** Then tighten the other side. When completely tightened, the gap should be approximately equal on both sides.

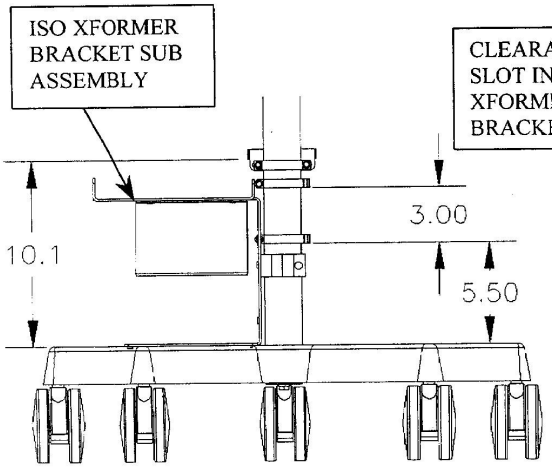


Figure 5

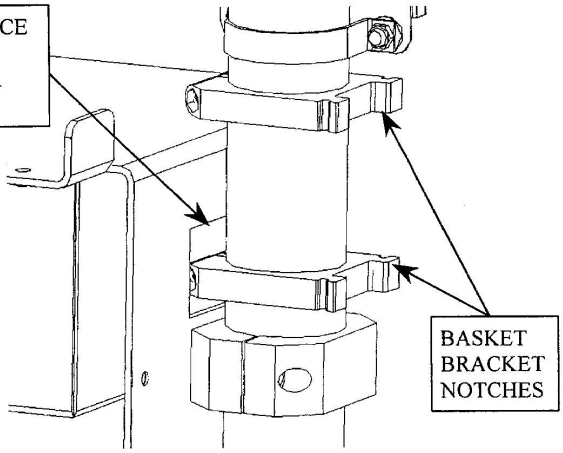


Figure 6

Locate the basket brackets to the approximate recommended heights in **Figure 5** and oriented so the notches are on the right side of the cart *(as you're facing the front)*. The lower basket bracket should fit into the clearance slot in the Transformer bracket, **Figure 6**. Tighten the #8-32 screws and nuts shown in **Figure 1,** with a Phillips screwdriver to lock the brackets in place.

Mount the Isolation transformer bracket sub-assembly, **Figure 5**, on the left side of the cart. It should just touch the top of base. Tighten the clamp per **Figure 3 & 4** with the supplied "Allan" wrench.

Rotate the Quick Clip to the left to allow insertion of the basket, **Figure 7**. Angle the basket into the notches of the top basket bracket *first.* The basket should be centered from front to back. Slide basket down to the lower bracket until the top ring touches the top bracket. It may be necessary to spread the wire at the bottom slightly so the notch can capture it. Move the quick clip to its original position and tighten completely. Your assembly should look like **Figure 8**.

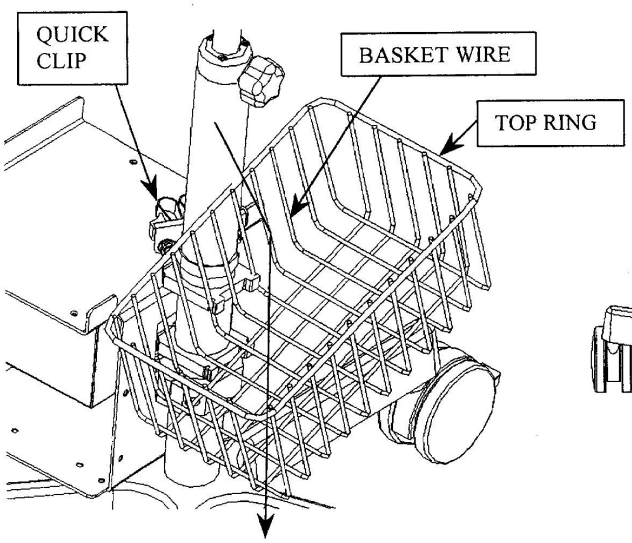


Figure 7

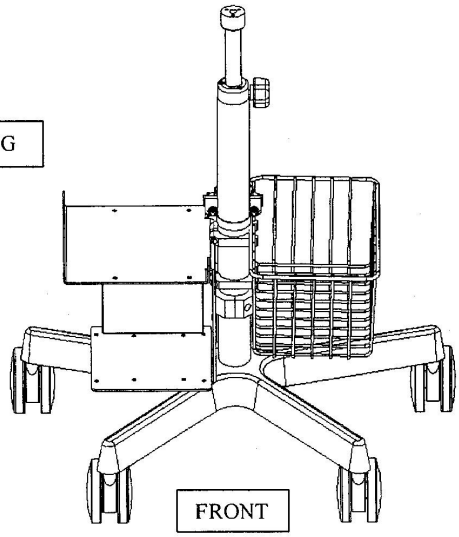


Figure 8

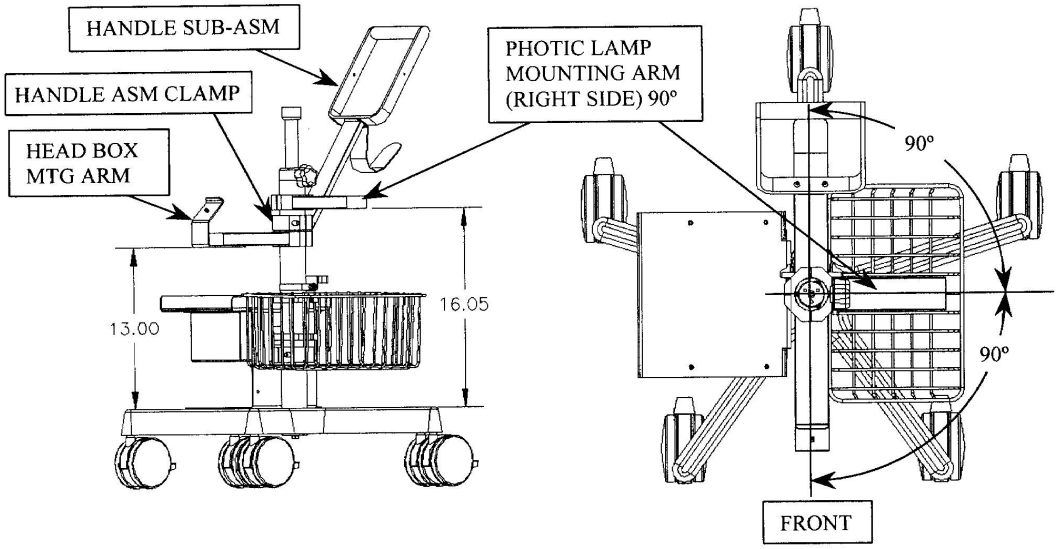


Figure 9

Assemble the Head box mounting arm facing the front, Photic mounting arm on the right per the dimensions in **Figure 9**. Mount the Handle sub-assembly clamp just above the Head box arm clamp, and to the rear of the cart.

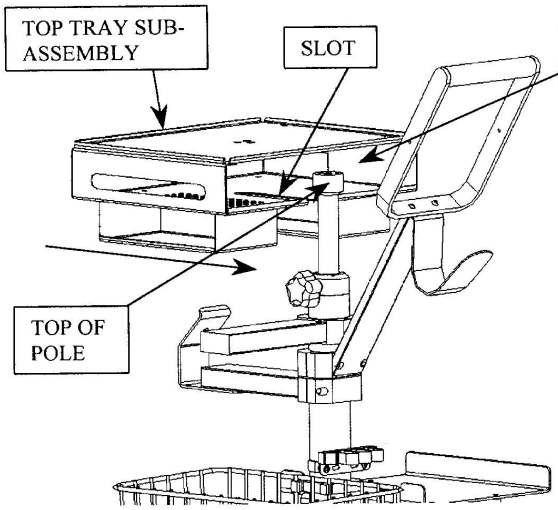


Figure 10

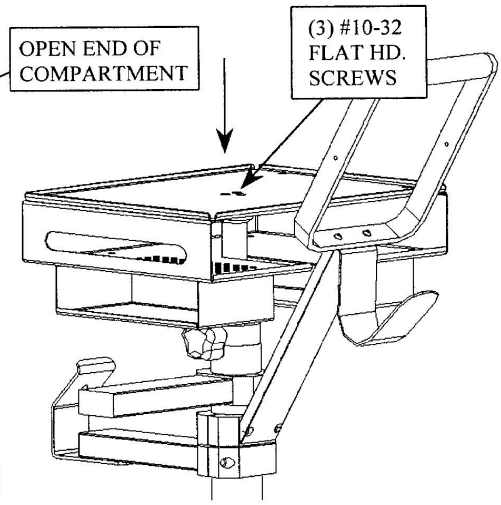


Figure 11

Assemble the Top tray sub-assembly to the top of the telescoping pole. Slide the open end of the compartment with slot onto the shaft toward the rear with the top of the pole inside the compartment per **Figure 10 & 11**. Rotate the pole as necessary so that the 3 holes in the tray all line up with the holes in the pole. Apply (3) #10-32 Flat head screws (supplied) and tighten until all three are snug.

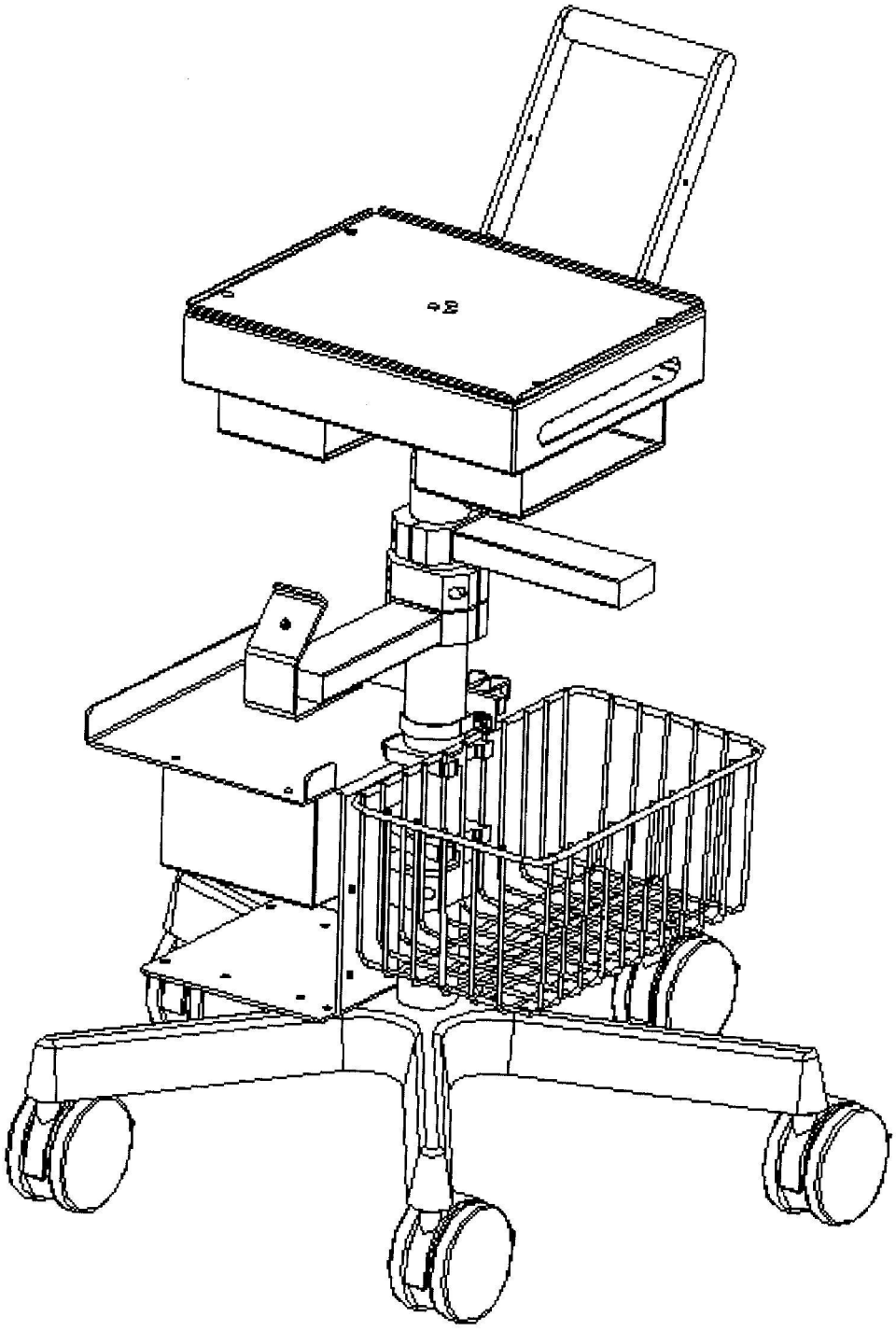


Figure 12

The completed assembly should look like Figure 12.

Modular Anthro Carts

This section applies only to systems with an Anthro cart. Depending on the model, some carts use three shelves while others use four.

— *Bottom shelf*

Position the computer in the center of the bottom shelf.

— *Second Shelf*

To secure the isolation transformer to the second shelf, follow these steps:

1. Align the holes in the base of the isolation transformer with the holes in the second shelf.
2. Insert the first of four screws through the pre-drilled hole of the shelf and the base of the isolation transformer.
3. Hold the screw in place,

   AND

4. Thread a nut onto the protruding end of the screw.
5. Tighten the nut securely.
6. Repeat these steps to install the remaining screws and nuts.
7. Verify the isolation transformer is securely in place.

— *Third Shelf*

To position the monitor and the keyboard on the third shelf, follow these steps:

1. Place the monitor (15", 17", 20") on the center of the third shelf.
2. Position the keyboard on the keyboard pull-out tray at the bottom of the third shelf.
3. Make one loop of the monitor cable

   AND

4. Position that cable behind the keyboard.

— *Top Shelf (Selected models only)*

To position the printer and optional buffer on the top shelf, follow these steps:

1. Extend the printer stand to accommodate the width of the printer.
2. Position the printer on top of the printer stand.
3. Position the buffer next to the printer on the shelf.

Types of computer

Bio-logic supplies its systems on several different types of computers. Not all models have the same components. All peripheral devices, however, have labels that identify their connection port. Match these labels with those on the computer. Because Bio-logic continuously improves the options available for its system, connection options may vary.

Note: Always check the labels to help you as you assemble or disassemble the system.

Installation (Deskop and Tower computers)

The Netlink series ships as a unit. The computer and keyboard are separate. A Natus Medical Incorporated representative usually performs initial installation procedures. If you decide to uninstall or move your system and must install it again, follow these steps:

1. Connect the keyboard cable to the back of the computer (if necessary).

2. If a printer is provided:

   —Connect the printer cable to the back of the computer at the connector labeled 'PRINTER' (if necessary).

   —Connect the printer's power cable from the isolation transformer to the power connector on the printer/plotter next to the printer cable connector.

3. Connect the power cable from the main power supply to the isolation transformer.

4. Connect the power cable from the computer to the isolation transformer.

5. If a separate monitor is provided:

   —Connect the monitor's cable to the DB15 connector labeled 'MONITOR' on the back of the computer.

   —Plug the monitor's power cord into the isolation transformer.

6. Connect one end of the ethernet cable to the connector under the computer icon on the Netlink or Netlink ICU box.

7. Connect the other end of the ethernet cable to the ethernet connector labeled ‘Netlink’ on the computer. On many computers, this connector is on the back panel. Check your computer's documentation for its location.

8. Turn the system power ON.

   —Wait for the Power indicator to light on the Netlink or Netlink ICU unit.
   —Wait for the Fault indicator to extinguish on the Netlink or Netlink ICU unit.

To uninstall the system, follow these steps in reverse order. Use "unplug" rather than plug and "disconnect from" rather than "connect to."

Installation (Notebook computers)

Installation procedures for laptop computers are very similar to those for desktop or tower computers. Differences may include:

—Many notebook computers have a built-in “touchpad” rather than a mouse. If you plug a mouse into a desktop computer, you usually connect it to the side of the laptop.

—Many notebook computers have a DVD or CD-ROM drive built into the system.

—Some notebook computers let you disengage the monitor lid by pressing buttons at the front, top, right and left corners of the unit.

—To connect power:

1. Plug the power cord into the side of the notebook.
2. Plug the other end of the power cord into an isolation transformer to hospital-grade wall outlet .

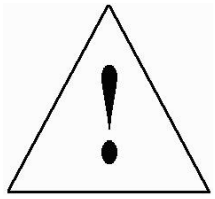
Installation (MPC All-In-One computers)

Installation procedures for MPC computers are very similar to those for desktop or tower computers. Differences may include:

1. Plug the Medical Power Supply 520-PSMPC1 (Jerome Industries WSX820M) into the MPC computer.
2. Plug the Hospital Grade power cord 541-CORD12 into the medical power supply.
3. Plug the other end of the power cord into a hospital-grade wall outlet.

WARNING

Only use the Power Supply Model Number 520-PSMPC1 with the MPC All-In-One computers.



WARNING

Always perform a leakage current test and compare to allowable standards BEFORE connecting the patient to monitoring equipment

NEVER connect a multiple portable socket outlet to the isolation transformer output receptacles. Additional cord connected equipment may increase leakage currents and present a hazard.

1. Measure the leakage currents with all devices connected; make sure they are less than the allowable maximum BEFORE connecting the diagnostic equipment to patient.
2. Turn the switch on the back of the isolation transformer ON.
3. Use the diagnostic equipment per the instructions.

Monitor

Monitor cables usually connect via a DB15 connector. One end of this cable is labeled "monitor" and connects to the computer port that is labeled "monitor". Connect the power cord to the back of the monitor.

Note: For comprehensive information, see the manual for your monitor.

Mouse

The mouse attaches to the back of the computer with a female pin connector (labeled with a pictorial "mouse," PS2, or Serial Port 1).

Note: For comprehensive information, see the manual for your mouse.

Security Block

A security Block may be attached to the Parallel Port. If so, plug the printer cable into the Block.

Printer

If no security Block is present, attach the Printer cable to the Parallel Port (marked 'Printer'). Attach the printer power supply to the Isolation Transformer.

External Storage Device(s)

Connect cable(s) on the storage device(s) to the appropriate board(s) on the computer. Connect the power cord to the back of the storage device. Connect the power cord to an available outlet in the Isolation Transformer.

Installation verification

Note: This section also appears in the Precautions and Safety Instructions section of this document. We repeat it here for your convenience.

To make sure that all system equipment is installed correctly before use:

—Verify that all equipment and cables are undamaged and in perfect working condition.

—Verify that all equipment and cables are connected according to the instructions in this manual.

—Verify that no unauthorized equipment is connected to the system.

—Verify that the equipment is properly grounded.

—Verify that all circuitry with a direct connection to the patient has been checked twice.

—Verify that all system or equipment batteries show the correct voltage and are in perfect working condition.

Notes

Use this page for your own notes.

Optional boards installation

WARNING

Before you begin ANY installation, disassembly, or assembly procedure, make sure that you read the PRECAUTIONS AND SAFETY INSTRUCTIONS section of this manual thoroughly. Be certain that you understand all of the information in that section and that you follow all of the instructions in it.

Network card installation for Windows systems

Use the following sections to help you install and verify the installation of a network card with Windows Systems.

Installing the Network card

WARNING

Make sure that power to the system computer is OFF before you install any PC boards.

CAUTION

Read the information about ESD in the Electrostatic Discharge (ESD) section of this document (turn to that section in your manual for more information) before you open the computer. Follow all ESD instructions to avoid damaging electronic components in the system.

To install a network card with the Netlink or Netlink ICU system, follow these steps:

1. Turn OFF the system at the Isolation Transformer.

2. Put on a grounded wrist strap before touching anything inside the computer.

NOTE: Natus Medical Incorporated packages a disposable, hypoallergenic, adhesive wrist strap with some pieces of equipment. Follow instructions on the package to make sure of proper grounding at all times when working on the equipment. A convenient electrical ground is the non-painted metal chassis of the computer. Other convenient grounds are non-painted water pipes and conduits.

3. Leave the power cable connected to the Isolation Transformer.

4. Disconnect peripheral cables and any other system cables

   AND

5. Label all unmarked cables and put them in a safe place.

6. Make sure that no peripheral (such as a Monitor, external modem, or external speakers) rests on top of the computer.

7. Remove the screws at the back of the computer, if necessary.

   If these are not "captive" screws, store the screws in a safe place.

8. Remove the cover from the computer .

9. Remove the rear metal chassis cover from the PCI expansion slot for the network card.

10. Insert the Intel Pro/100+ Management Adapter firmly into this slot.

11. Reassemble the computer.

12. Turn the system computer power ON,

    AND

13. Press the Delete key to activate the CMOS setup menu.

Network Driver Setup

Windows 2000 and Windows XP use a “Wizard” to automatically install drivers for the network card. If you are using Windows 98 or the automatic installation fails for some reason, follow these steps to update the network driver for the network card:

Note: These steps continue from the steps in the last procedure.

1. Enter the PCI/Plug and Play Setup that applies to your installation.

3. Set the IRQ Priority for the PCI slot for the second network card to 9.

4. Verify all options are correct.

5. Save the changes and exit CMOS setup.

   Windows 2000 and Windows XP start automatically.

6. Verify the **Update Device Driver Wizard** screen displays the PCI Ethernet Controller.

7. Wait for the system to prompt you to insert the **Intel Pro/100+ Management Adapter Configuration and Drivers** diskette.

8. Insert the diskette.

9. Select Next.

   The system begins to copy files.

   Note: If a message appears stating that a file cannot be found, enter the root directory for the CD into the "Copy files from" field and select the OK button. When the system finds the driver, the "Windows found the following updated driver for this device" message appears. Click on Finish.

10. Wait for the "Insert Disk" message to appear on the screen.
11. Insert the Windows 98, Windows 2000, or Windows XP CD.
12. Select the OK button at the bottom of the dialog box for files to continue copying.

    Note: If a message appears stating that a file cannot be found, enter X: Win2000 or X: WinXP in the "Copy files from . . ." field then select the OK button. "X" is the drive letter of the CD-ROM.

13. Wait until the system is done copying files and the **System Settings Change** message box appears.
14. Select the Yes button to restart the computer.

Configuring the Network Card for Windows 2000

Note: Windows 2000 usually handles this through an installation "Wizard." If this "Wizard" fails to run, follow these steps:

1. Wait until Windows 200 or Windows XP restarts.
2. Login, if necessary.
3. Click on the My Network Places icon in the Windows 2000 Desktop screen.
4. Select Properties from the pop-up menu.

   This displays the Network dialog box and its tabs.

5. Click on the Configuration tab.
6. Make sure that two network cards appear in the list of network components.
7. Click on any client in the network components list except for Microsoft Networks.
8. Click on the REMOVE command button to remove the client from the list.
9. Repeat these steps for all CLIENTS except Microsoft Networks.
10. Click on any PROTOCOL in the network components list except for NetBEUI and TCP/IP.

11. Click on the REMOVE command button to remove the protocol from the list.
12. Repeat these steps for all PROTOCOLS except NetBEUI and TCP/IP.
13. Add the TCP/IP protocol to the network component list, if necessary.

To add the TCPIP protocol:

14. Click the Add button.

    The "Select Network Component Type" dialog box appears.

15. Click on Protocol.

    A list of Manufacturers appears.

16. Click on Microsoft.

    A list of Network Protocols appears.

17. Select TCP/IP from the list of network protocols.
18. Click on the OK button.
19. Make sure that the screen looks like the illustration.

To set up the TCP/IP protocol:

20. Highlight and select TCP/IP from the network components list.
21. Click on Properties.

    This activates the TCP/IP Properties window. This window has several tabs you must use to continue the installation process.

22. Click on the IP Address tab.
23. Click on the circle next to "Specify an IP Address."

    This activates that section of the tab.

24. Click the mouse in the IP Address field.

    This places a text cursor in that field.

25. Type: a number in the range 192.168.1.0 to 192.168.255.0.
26. Click the mouse in the Subnet Mask field.

    This places a text cursor in that field.

27. Type: 255.255.255.0.
28. Select the Bindings tab.
29. Click on the boxes next to the **Microsoft Networks** and **File and Printer Sharing** items until no checkmark appears in those boxes.

    This de-selects or deactivates these features.
30. Click on the OK command button.
31. Click NO.

Headbox Installation

See the Netlink Cable Connections section of this document.

Printer (optional)

This section applies only to systems with an external printing device.

1. Connect the male, DB25 cable connector labeled PRINTER to the port labeled PRINTER on the back of the system computer.

2. Connect other end of the DB25 printer cable connector to the parallel port on the back of the printer.

WARNING

Plug power cord from any peripheral device that does not have a medical grade power supply (such as a printer, external optical drive) into the isolation transformer whenever a patient is connected. Plugging a peripheral device directly into a wall outlet, without a medical grade power supply, can harm the patient.

3. Connect the female end of the printer power cord into the IEC connector on the back of the printer.

4. Connect the opposite end of the printer power cord into the isolation transformer.

Mouse Installation

To connect the mouse to the system computer, follow these steps:

1. Plug cable connector on the mouse into the connector labeled "Mouse" on the back of the system computer.

   If your computer does not have labeled connectors, please consult the User's Documentation for your computer to identify connectors.

2. Tighten any screws on the connector until the cable is securely attached.

Monitor Installation

To connect the monitor to the system computer, follow these steps:

1. Plug the connector on the monitor's cable into the DB15 connector labeled MONITOR at the back of computer.

   If your computer does not have labeled connectors, please consult the User's Documentation for your computer to identify connectors.

WARNING

Plug power cord from any peripheral device that does not have a medical grade power supply (such as a printer, external optical drive) into the isolation transformer whenever a patient is connected. Plugging a peripheral device directly into a wall outlet, without a medical grade power supply, can harm the patient.

2. Plug the female connector end on the monitor power cord into the appropriate connector on the back of the monitor

3. Plug the opposite end of the monitor power cord into the isolation transformer.

Photic Stimulator

Refer to the Photic User's and Service Manual 590-PHOTIC for specifications and installation.

Final System Assembly

To complete system assembly, follow these steps:

1. Arrange all cables neatly.
2. Make sure all boards are secure.
3. Replace the cover on the computer, if necessary.
4. Plug the female connector of the isolation transformer's cable into the power cord on the back of the system computer.
5. Plug the male connector of the isolation transformer's cable into the wall outlet.
6. Plug all other components into the isolation transformer's outlets.

Notes

Use this page for your own notes.

Data Acquisition modules and circuit boards

The Netlink data acquisition module (headbox) contains 40 channels and the Netlink ICU data acquisition module (headbox) contains 26 channels . Each of these channels supports circuitry that amplifies, filters, and converts low-level EEG and DC signals from analog to digital. Electrode leads connect to the input jacks in the headbox and carry in EEG signals from the patient. The paragraphs that follow describe cable connections for the Netlink and Netlink ICU headbox.

Netlink and Netlink ICU Cable Connections

The Netlink and Netlink ICU headbox uses an Ethernet cable to transfer digital EEG signals to a system computer. Establish these connections as follows:

1. Connect one end of the ethernet cable to the connector under the computer icon on the Netlink or Netlink ICU box.

2. Connect the other end of the ethernet cable to the ethernet connector labeled ‘Netlink’ on the computer. On many computers, this connector is on the back panel. Check your computer's documentation for its location.

3. Turn the system power ON.

   —Wait for the Power indicator to light.
   —Wait for the Fault indicator to extinguish.

Note: Connect the headbox before starting a data collection, calibration, or impedance test.

Circuit Boards in Netlink and Netlink ICU

The Netlink and Netlink ICU unit contains no field-replaceable circuit boards. Please contact Natus Medical Incorporated Customer Support at 1-800-303-0306 for replacement procedures.

Circuit Boards in computer

Ethernet interface board

The Ethernet interface board communicates between the Netlink and Netlink ICU Headbox and the system computer.

ATI Radeon Video PCB (with Digital Video option)

This circuit board lets you play back digital video in a separate window on the display.

Optibase™ Digital Video Encoder PCB (with Digital Video option)

This circuit board digitizes video signals from a camera, saves those signals in MPG format, and passes them to a video PCB for view.

Digital I/O

This circuit board is for the Visiplex Paging option.

Reseating circuit boards

WARNING

Make sure that power to the system computer is OFF before you reseat any PC boards.

CAUTION

Read the information about ESD in the Electrostatic Discharge (ESD) section of this document (turn to that section in your manual for more information) before you open the computer. Follow all ESD instructions to avoid damaging electronic components in the system.

If you suspect that boards have worked loose, you can reseat them by pulling them out of the computer, and then pushing them firmly back in place. This re-establishes a good connection between the board and the computer.

To remove and reseat printed circuit boards:

1. Turn OFF the system at the Isolation Transformer.

2. Put on a grounded wrist strap before touching anything inside the computer.

   NOTE: Natus Medical Incorporated packages a disposable, hypoallergenic, adhesive wrist strap with some pieces of equipment. Follow instructions on the package to make sure of proper grounding at all times when working on the equipment. A convenient electrical ground is the non-painted metal chassis of the computer. Other convenient grounds are non-painted water pipes and conduits.

3. Leave the power cable connected to the Isolation Transformer.

4. Disconnect peripheral cables and any other system cables

   AND

5. Label all unmarked cables and put them in a safe place.

6. Make sure that no peripheral (such as a Monitor, external modem, or external speakers) rests on top of the computer.

7. Remove the screws at the back of the computer, if necessary.

   If these are not "captive" screws, store the screws in a safe place.

8. Remove the cover from the computer.

9. Disconnect any cables from the printed circuit board(s) you want to reseat.

10. Label all unmarked PCB cables and put them in a safe place.

11. Remove the bracket that may be present to hold the printed circuit boards in place.

12. Remove the screw from the expansion slot brackets of the PCB you want to reseat.

13. Put the screw in a safe place.

14. Pull the PCB straight out of the slot

    THEN

15. Push the PCB firmly back into the same slot.

16. Replace any brackets that were removed to hold the PCB in place.

17. Replace the screw in the expansion slot brackets of the PCB you have reseated.

18. Repeat this procedure for all PCBs that you want to reseat.

19. Reconnect any cables you disconnected.

20. Replace the cover of the computer.

21. Secure the cover of the computer with the screws you removed earlier in this procedure (if necessary).

Care and Maintenance

This section contains general information about maintaining and caring for the system.

Preventive maintenance checklists

Tools

Make sure that you have these tools before you begin preventive maintenance procedures:

- ☐ Basic PC Tool Kit
- ☐ Vacuum or Compressed Air device
- ☐ A/C / ESD Ground Tester
- ☐ Head Cleaning Disks (All Media)
- ☐ PC Test / Certification Software
- ☐ Anti-Virus Software

Preliminary system inspection

- ☐ Inspect all cables for bent pins, exposed wires, or insulation cuts.
- ☐ Inspect system configuration (i.e. proper isolation transformer use.)
- ☐ Inspect headbox for loose/damaged pins.
- ☐ Inspect and tighten all screws.
- ☐ Test A/C outlet for proper wiring and acceptable grounding.

Basic system functionality check

- ☐ Boot-up computer.
- ☐ Check mouse function.
- ☐ Access all disk drives.
- ☐ Check hard drive for viruses.
- ☐ Perform a test-print on printer (if applicable.)
- ☐ Check monitor adjustment.
- ☐ Check keyboard function

Clean system components

No special cleaning is required for the Netlink/Netlink ICU headbox. Ordinary, 'house-keeping' type cleaning to prevent the accumulation of dust or debris is adequate.

- ☐ Vacuum dust from computer & power supply.
- ☐ Blow remaining dust from computer & power supply.
- ☐ Blow dust from keyboard.
- ☐ Blow dust from monitor.
- ☐ Vacuum paper dust from printer.
- ☐ Clean floppy and optical drive heads.
- ☐ Clean mouse ball and rollers.
- ☐ Clean printer

Optimize system

- ☐ Run *SCANDISK* on local hard drive partitions & delete *.chk files.
- ☐ Run *DEFRAG* on local hard drive partitions.
- ☐ Run PC Test / Certification software
- ☐ Resolve any conflicts in Windows Device Manager (if possible.)
- ☐ Run PT&I Utilities – Repair
- ☐ Run PT&I Utilities - Backup

Final system verification

- ☐ Run headbox diagnostic software.
- ☐ Run collection/analysis software.
- ☐ Calibrate headbox.
- ☐ Check impedances.
- ☐ Collect calibration signals and read back.

Test procedures and diagnostics

Collection test

You can visually inspect the patient signals during collection and verify that they appear satisfactory. This is an important step in testing the operation of the Netlink and Netlink ICU system. The procedure for collecting data with Netlink and Netlink ICU appears in the Ceegraph and Sleepscan User's Manuals. Calibrate and impedance test before starting collection.

If problems occur, the first recourse is to check all connections, including all cable connections and the patient-electrode connections. If problems still exist, you may need to reseat the boards within the computer. Turn to "Reseating circuit boards."

Printer test

IGNORE THIS TEST IF THE SYSTEM HAS NO PRINTER

Consult the operation or service manual for the printer you are using. Follow the manufacturer's instructions to perform a printer test.

Netlink and Netlink ICU Diagnostics

Netlink Diagnostics is an application program that runs on a Pentium II (or better) computer and works with a Windows 98, 2000, and XP operating system. The Customer version of Netlink Diagnostics lets you ensure correct functioning of the Netlink and Netlink ICU Headbox and isolate problems with the box for easy repair.

A single ini file parameter controls all the differences between Customer diagnostics and Manufacturing/Service. All features can be enabled or disabled by changing a single ini file parameter.

Note: Please refer to the Installation Files section of this document for more ini file information.

Customer Features

The Netlink Diagnostics program for Customer Support has the manual control disabled. This program contains a G2DIAG.txt file. This file has test results that the system overwrites every time you run diagnostics on the computer. Your ini file has an open tolerance to allow more variance without causing errors because you can enable or disable all the features by changing the ini file parameters

Additional Customer Support features include: running all the tests once, viewing the test summary as pass or fail for each test, and viewing the test summary for each channel.

Users can find the Netlink diagnostic program at the Natus Medical Incorporated FTP site. For more information, make contact with a Customer Support Representative at 1-800-303-0306.

Features

Netlink diagnostics are compatible with the firmware in the Netlink and Netlink ICU units. No other software is necessary. The diagnostics program identifies all of the hardwareit is testing, such as:

—Netlink or Netlink ICU with no Oximeter, but with DC channels.

—Netlink or Netlink ICU with Oximeter and DC channels.

Features for the customer version of the Netlink diagnostic program also give users the ability to:

Run all the tests once.
View the test summary as only pass or fail for each item.
View test summary results for each channel.

Installation files

During installation, Natus Medical Incorporated Places the Netlink diagnostic program on the system computer. This programm includes a “netlink diagnostics. Ini” file that resides in the computer’s Windows directory. This file contains lines of code that determine operating parameters for the diagnostic program. For the customer version of this program, certain lines of code must read as follows:

Line in “netlink diagnostics.ini file:	**Content should read:**
Program mode =	Customer
Sound =	PC Speaker
DC_CAL_MAIN_PERCENT =	10
ENABLE_PERCENT =	10

Bio-logic Software

The Netlink Diagnostics is compatible with the Netlink and Netlink ICU firmware. No other software is required on the Netlink and Netlink ICU box besides the firmware.

Other Software

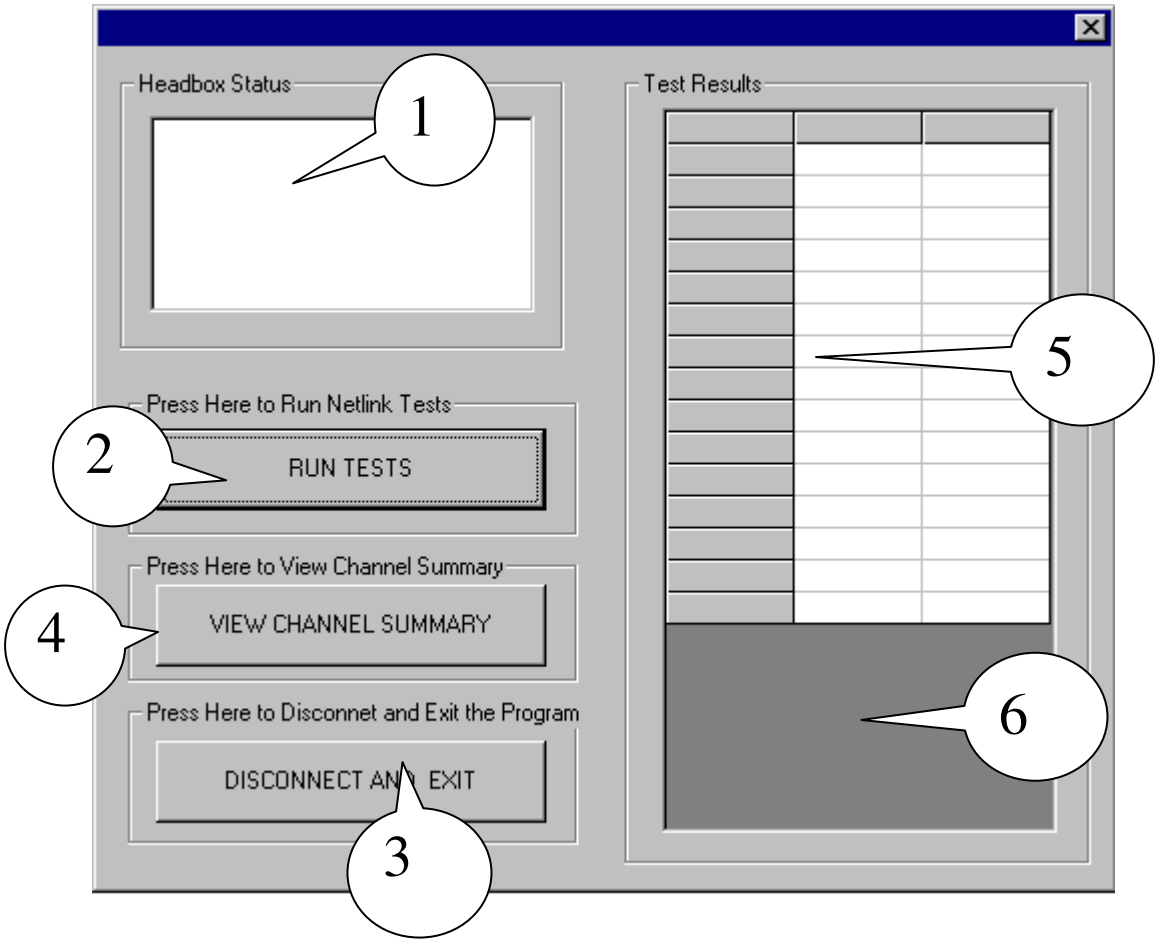
No conflicts exist between the Netlink Diagnostics software and any other software on the computer.

Impacts on Installation Software

The Ceegraph and Sleepscan installation software install only the Customer version of the Netlink Diagnostics program.

Netlink Diagnostics Setup Screen

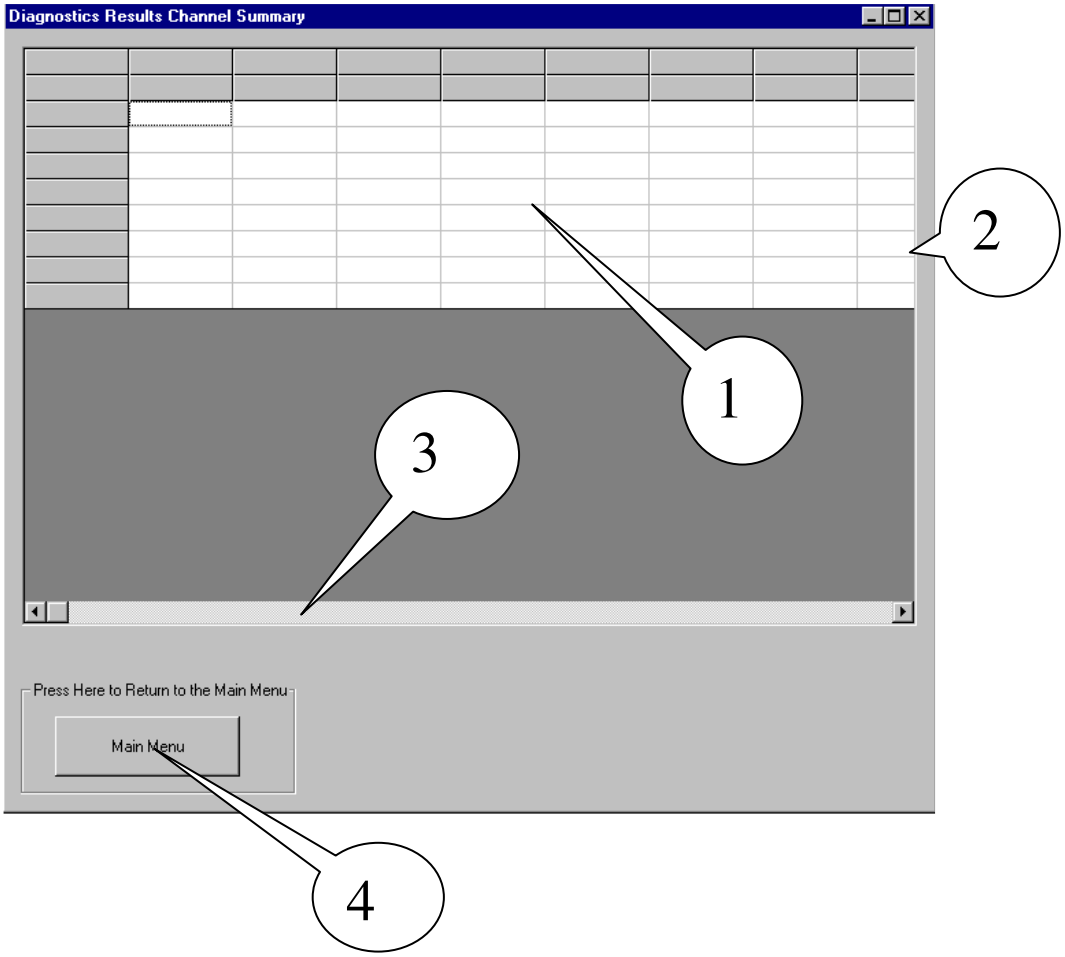
Command buttons and Information areas appear on the Setup screen. Here users are able to view the headbox status window. They are able to run Netlink and Netlink ICU tests, disconnect and exit the program, view the channel summaries and view the test results. The below illustration and table describe the screen and its components.



Number	Component	Description
1	Headbox Status Window	This area allows the user to view the status window and see the connection status of the Netlink Diagnostics and the Headbox. The user is also able to see the firmware version number.
2	Run Tests	This command button allows the user to run Netlink Tests.
3	Disconnect and Exit	This command button allows the user to disconnect from the Netlink and Netlink ICU Hardware and exit the program.
4	View Channel Summary	This command button allows the user to view the channel summary.
5	Test Results	This area allows the user to see how the tests are updated, when they are completed, and it displays the results as pass and fail counts.
6	Vertical Scroll Bar	A vertical scroll bar will be necessary once there are more tests to be viewed.

Netlink Diagnostics Results Channel Summary Screen

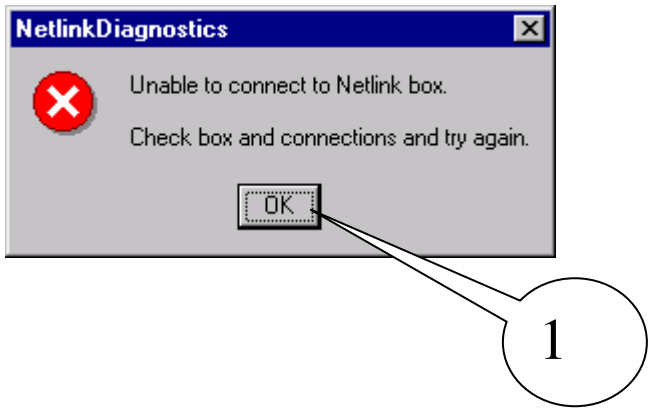
Command buttons and Information areas appear on the Results Channel Summary Screen. Here users are able to view the pass or fail counts, use both the vertical and horizontal scroll bars, and they are able to return to the main menu. The below illustration and table describe the screen and its components.



Number	Component	Description
1	Pass or Fail Counts	This area allows the user to see all of the pass and fail counts of the Netlink Diagnostics.
2	Vertical Scroll Bar	This vertical scroll bar will be necessary once more tests are available.
3	Scroll Bar	This scroll bar allows the user to see the rest of the available channels.
4	Main Menu	This command button allows the user to return to the main menu.

Netlink Diagnostics Connection Warning Screen

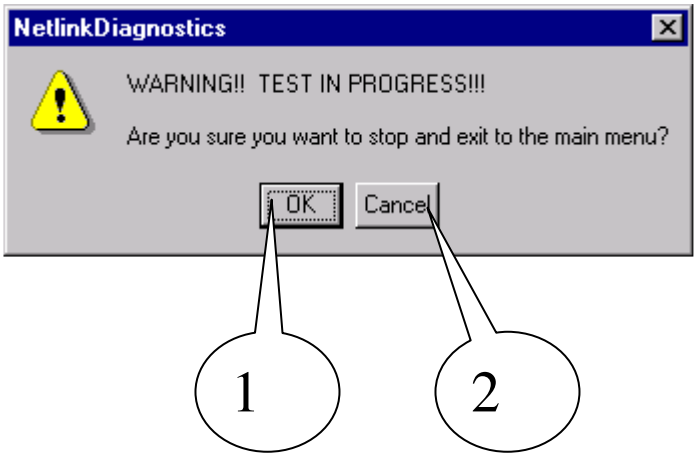
When the diagnostics program fails to connect to the Netlink or Netlink ICU hardware, a Connection Warning screen appears. Possible solutions for this problem are to check the cable connection to tray, verify the IP address, or reset the Netlink or Netlink ICU box. Netlink Diagnostics will automatically try to connect to the Netlink or Netlink ICU hardware when the program is restarted. Here the user will be able to exit the program. The below illustration and table describe the screen and its components.



Number	Component	Description
I	OK	This command button allows the user to exit the program.

Netlink Diagnostics Test in Progress Warning Screen

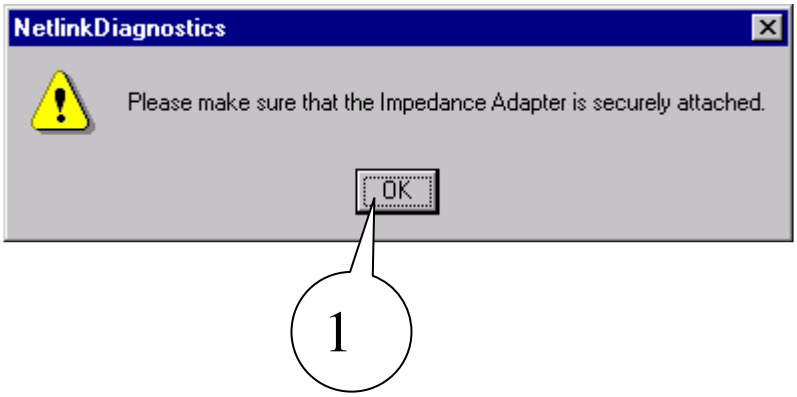
When the user tries to exit or cancel, while one or more tests are in progress, a Test in Progress Warning screen appears. Here the user is able to continue to run more tests or exit to the main menu. The below illustration and table describe the screen and its components.



Number	Component	Description
1	OK	This command button allows the user to exit to the main menu, which is the Setup screen.
2	Cancel	This command button allows the user to continue to run tests.

Netlink Diagnostics Impedance Adapter Reminder Screen

Every time the user tries to run a test, the Impedance Adapter Reminder dialog screen comes up. It is just a reminder that the impedance adapter must be on during the Diagnostics run. Here the user is able to clear the dialog box and continue to run Netlink Diagnostics. The below illustration and table describe the screen and its components.



Number	Component	Description
I	OK	This command button allows the user to close the dialog box and continue running the Netlink Diagnostics.

Impedance Circuit Test

Test the system's impedance circuitry by plugging a Natus Medical Incorporated impedance test adapter with known resistor values into the input connectors on the headbox. Impedance test results must comply with this table:

Impedance test adapter: 580-SLPIMP		
Reference = 5.0 K Ohms	Common = 4.0 K Ohms	
Ch 01 = 1.0 K Ohms	Ch 17 = 1.0 K Ohms	
Ch 02 = 2.0 K Ohms	Ch 18 = 2.0 K Ohms	
Ch 03 = 1.0 K Ohms	Ch 19 = 1.0 K Ohms	
Ch 04 = 2.0 K Ohms	Ch 20 = 2.0 K Ohms	
Ch 05 = 1.0 K Ohms	Ch 21 = 2.0 K Ohms	
Ch 06 = 2.0 K Ohms	Ch 22 = 1.0 K Ohms	
Ch 07 = 1.0 K Ohms	Ch 23 = 2.0 K Ohms	
Ch 08 = 2.0 K Ohms	Ch 24 = 1.0 K Ohms	
Ch 09 = 1.0 K Ohms	Ch 25 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 10 = 2.0 K Ohms	Ch 26 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 11 = 1.0 K Ohms	Ch 27 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 12 = 2.0 K Ohms	Ch 28 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 13 = 1.0 K Ohms	Ch 29 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 14 = 2.0 K Ohms	Ch 30 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 15 = 1.0 K Ohms	Ch 31 ACT = 1.0 K Ohms	REF = 2.0 K Ohms
Ch 16 = 2.0 K Ohms	Ch 32 ACT = 1.0 K Ohms	REF = 2.0 K Ohms

UTILITIES

Utility programs augment the effectiveness of your hardware, your operating system software, and your application software. This section of this document presents some useful Utility programs that you can run on your Netlink or Netlink ICU system.

Using the Tools utilities in Windows 2000

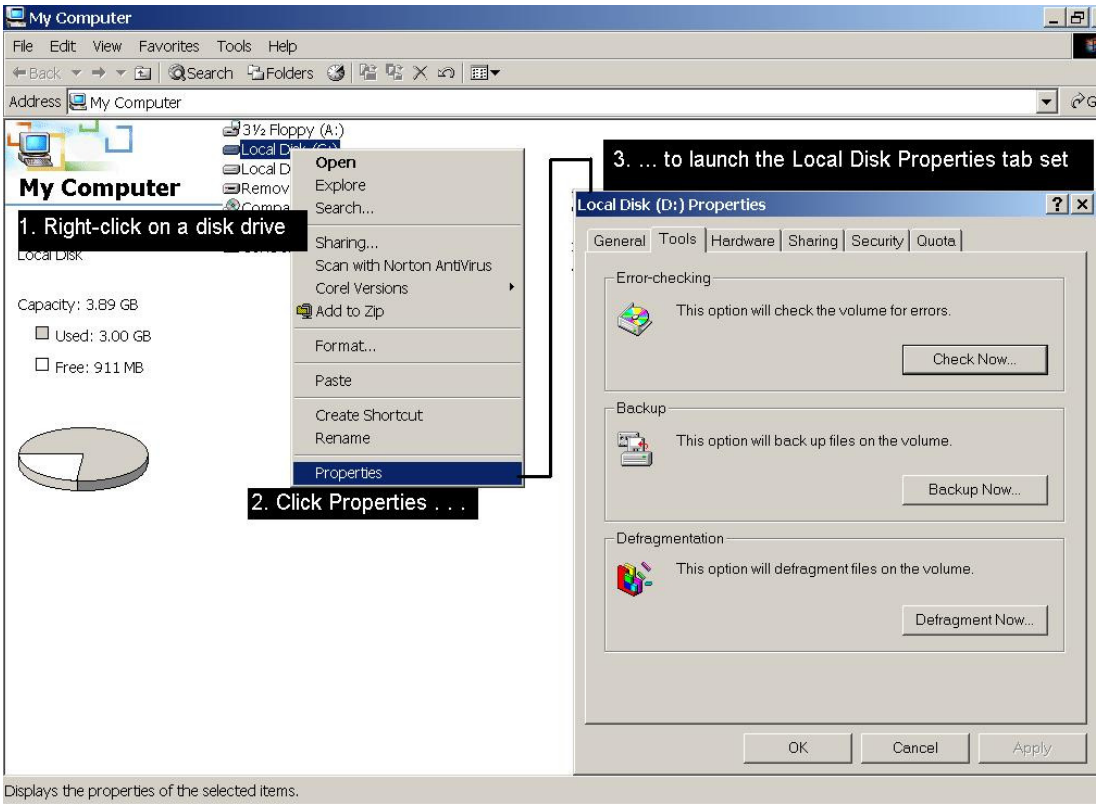
The Tools utilities let you:

—Check the media on your disk drives for errors and correct those errors.

—Backup the content of the media on a disk drive.

—Defragment the media on a disk drive.

To launch the Tools Utility



1. Place your mouse pointer over the "My Computer" icon ( ) on the Windows 2000 desktop.

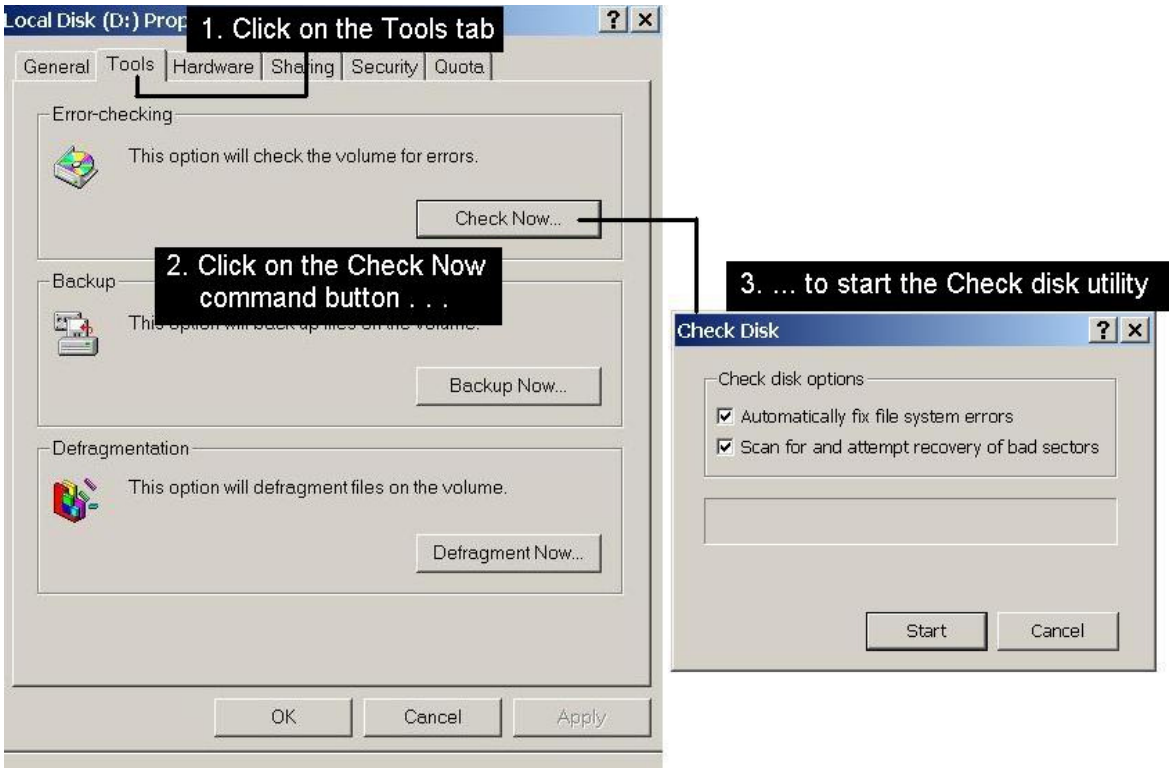
2. Press the Left mouse button.
   This launches the My Computer window.

3. Place your mouse pointer over oneof the computer's disk drives.
   Make sure the disk drive you choose has data stored on it.

4. Press the RIGHT mouse button.
   A list of options appears.

5. Click the mouse on the Properties option.
   The Local Drive Properties tab set appears.

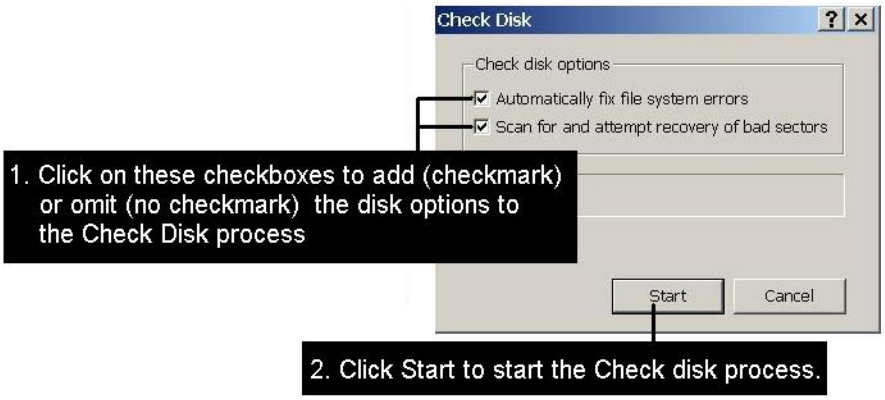
To check the disk drive for errors



1. Launch the Local disk Properties tab set.
   See the To launch the tools utility section of this document..

2. Click on the Tools tab.
   This brings the Tools tab to the top of the set of tabs.

3. Click on the Check Now command button.
   This starts the Check Disk utility.

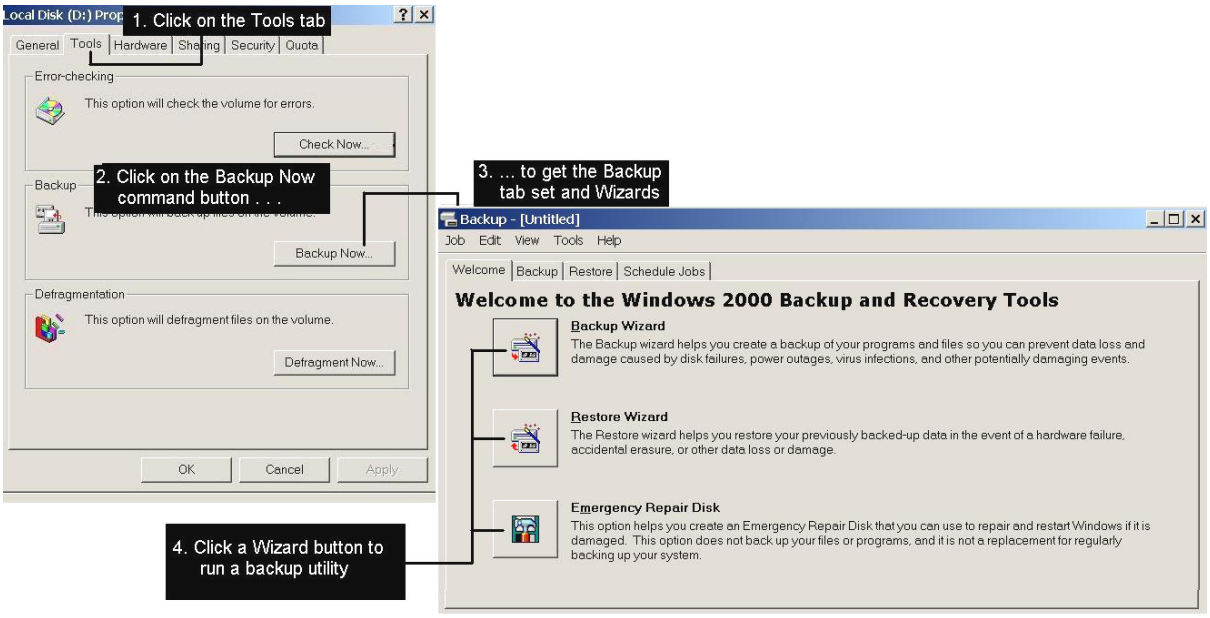

Check Disk
Check disk options
Automatically fix file system errors
Scan for and attempt recovery of bad sectors
1. Click on these checkboxes to add (checkmark) or omit (no checkmark) the disk options to the Check Disk process
Start
Cancel
2. Click Start to start the Check disk process.

4. Click on these checkboxes to add (checkmark) or omit (no checkmark) the disk options tothe Check Disk process

5. Click Start to start the Check Disk process.
   When the Check Disk process ends, a message box appears that explains the results of the process.

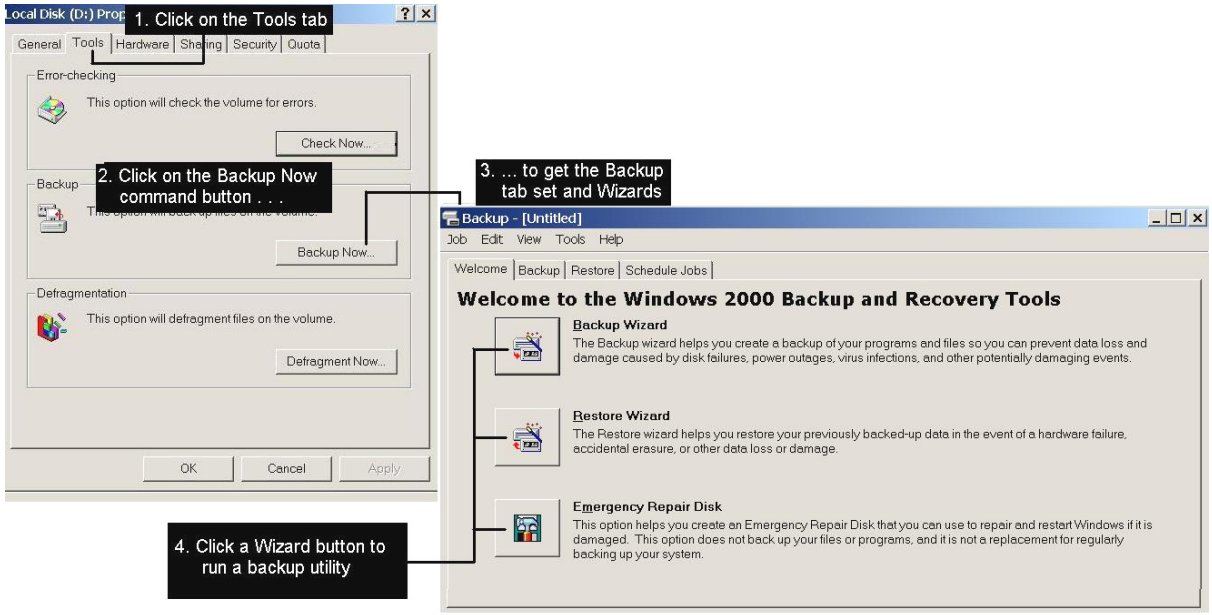
6. Click on the OK button on the results box to end the Check Disk process.

To backup a disk drive


1. Click on the Tools tab
2. Click on the Backup Now command button . . .
3. ... to get the Backup tab set and Wizards
4. Click a Wizard button to run a backup utility
General
Tools
Hardware
Sharing
Security
Quota
Error-checking
This option will check the volume for errors.
Check Now...
Backup
Backup Now...
Defragmentation
This option will defragment files on the volume.
Defragment Now...
OK
Cancel
Apply
Backup - [Untitled]
Job Edit View Tools Help
Welcome
Backup
Restore
Schedule Jobs
Welcome to the Windows 2000 Backup and Recovery Tools
Backup Wizard
The Backup wizard helps you create a backup of your programs and files so you can prevent data loss and damage caused by disk failures, power outages, virus infections, and other potentially damaging events.
Restore Wizard
The Restore wizard helps you restore your previously backed-up data in the event of a hardware failure, accidental erasure, or other data loss or damage.
Emergency Repair Disk
This option helps you create an Emergency Repair Disk that you can use to repair and restart Windows if it is damaged. This option does not back up your files or programs, and it is not a replacement for regularly backing up your system.

1. Launch the Local Disk Properties tab set.
   See the To launch the tools utility section of this document.

2. Click on the Tools tab.
   This brings the Tools tab to the top of the set of tabs.

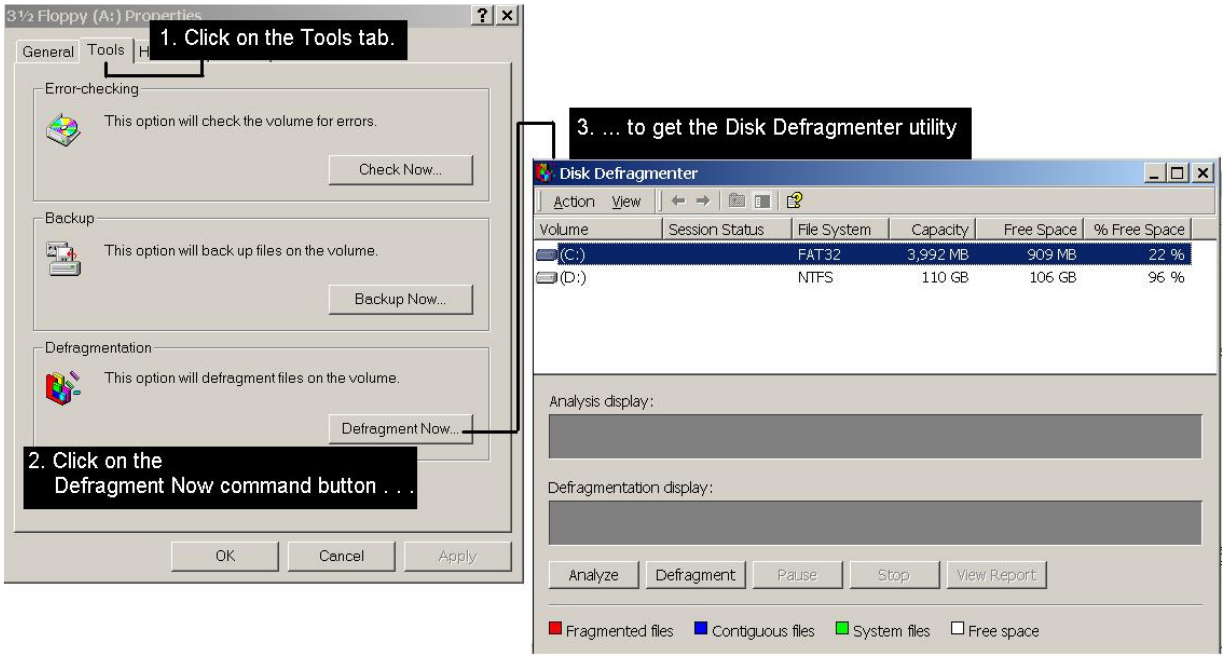

1. Click on the Tools tab
2. Click on the Backup Now command button . . .
3. ... to get the Backup tab set and Wizards
4. Click a Wizard button to run a backup utility
Local Disk (D:) Prop
General
Tools
Hardware
Sharing
Security
Quota
Error-checking
This option will check the volume for errors.
Check Now...
Backup
Backup Now...
Defragmentation
This option will defragment files on the volume.
Defragment Now...
OK
Cancel
Apply
Backup - [Untitled]
Job Edit View Tools Help
Welcome
Backup
Restore
Schedule Jobs
Welcome to the Windows 2000 Backup and Recovery Tools
Backup Wizard
The Backup wizard helps you create a backup of your programs and files so you can prevent data loss and damage caused by disk failures, power outages, virus infections, and other potentially damaging events.
Restore Wizard
The Restore wizard helps you restore your previously backed-up data in the event of a hardware failure, accidental erasure, or other data loss or damage.
Emergency Repair Disk
This option helps you create an Emergency Repair Disk that you can use to repair and restart Windows if it is damaged. This option does not back up your files or programs, and it is not a replacement for regularly backing up your system.

3. Click on the Backup Now command button.
   This launches the Backup tab set.

4. Click on the Welcome command (if necessary).
   This brings the Welcome tab to the "top" of the set of tabs.

5. Click on one of the Wizard command buttons.
   This starts the Wizard for a backup utility.

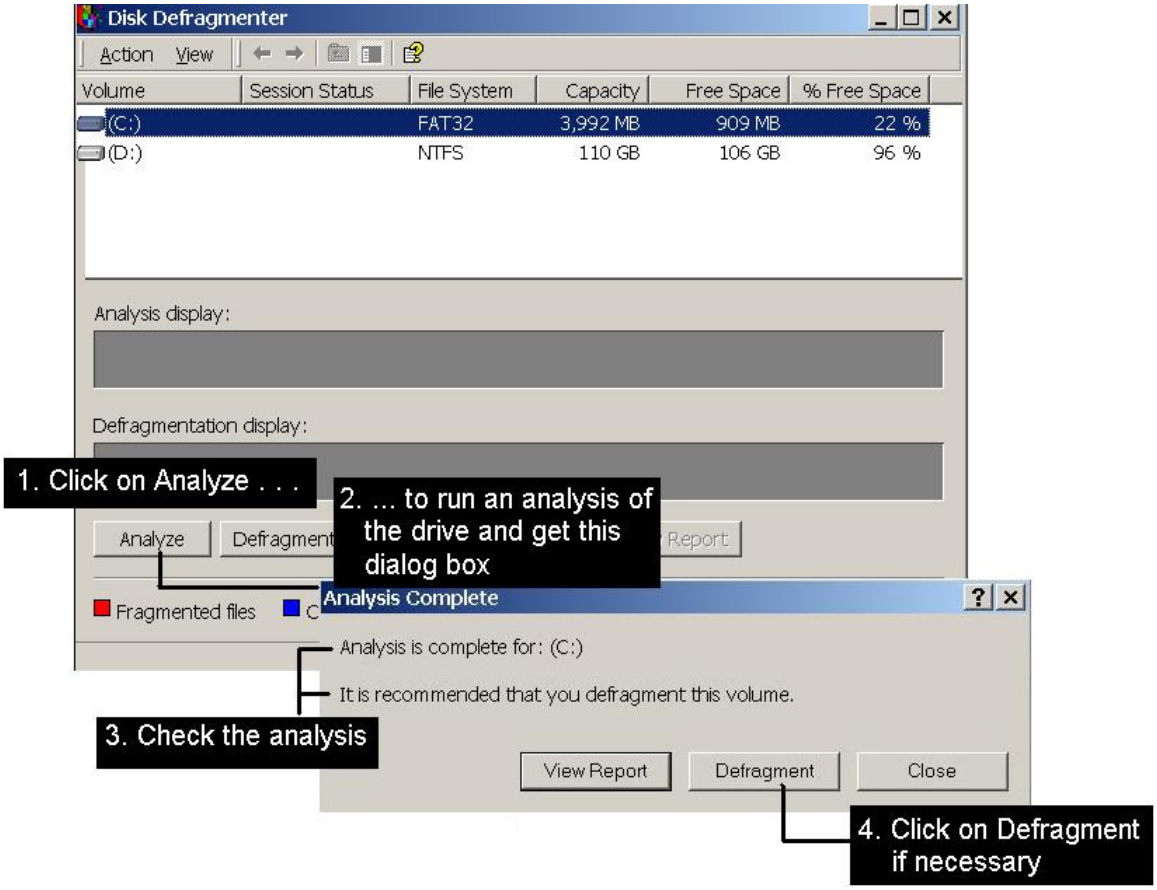
To defragment a disk drive



1. Launch the Local Disk Properties tab set.
   See the To launch the tools utility section of this document..

2. Click on the Tools tab.
   This brings the Tools tab to the top of the set of tabs.

3. Click on the Defragment Now command button.
   This starts the Disk Defragment utility.

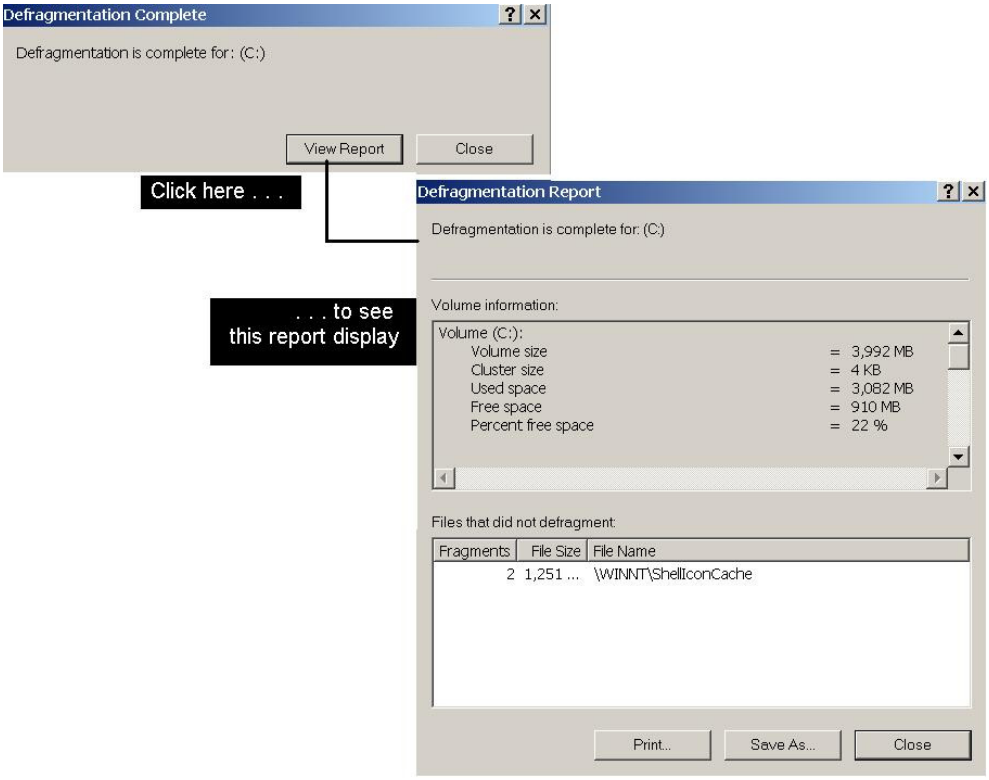


4. Click on the Analyze command button.
   This launches the Analyze utility.

5. Wait until the Analyze utility ends and the Analysis Complete dialog box appears.

6. Check the information on the Analysis Comlpete dialog box.
   This information will tell you the results of Windows 2000's analysis of the disk drive you selected. It also recommends for or against a defragmentation procedure.

7. Click on the Defragment command button, if necessary.
   This starts the defragment utility for the disk drive you selected.



8. Wait until the defragment utility ends and the.defragmentation dialog box appears.

9. Click on the Close button to end the defragmentation process,

   OR

10. Clcik on the View Report command button to see the results of the defragmentation process.

11. Click on the Close button to end the defragmentation process,

    OR

12. Click on the Save As button to save the results,

    OR

13. Click on the Print button to print the results.

Using the Tools utilities in Windows XP

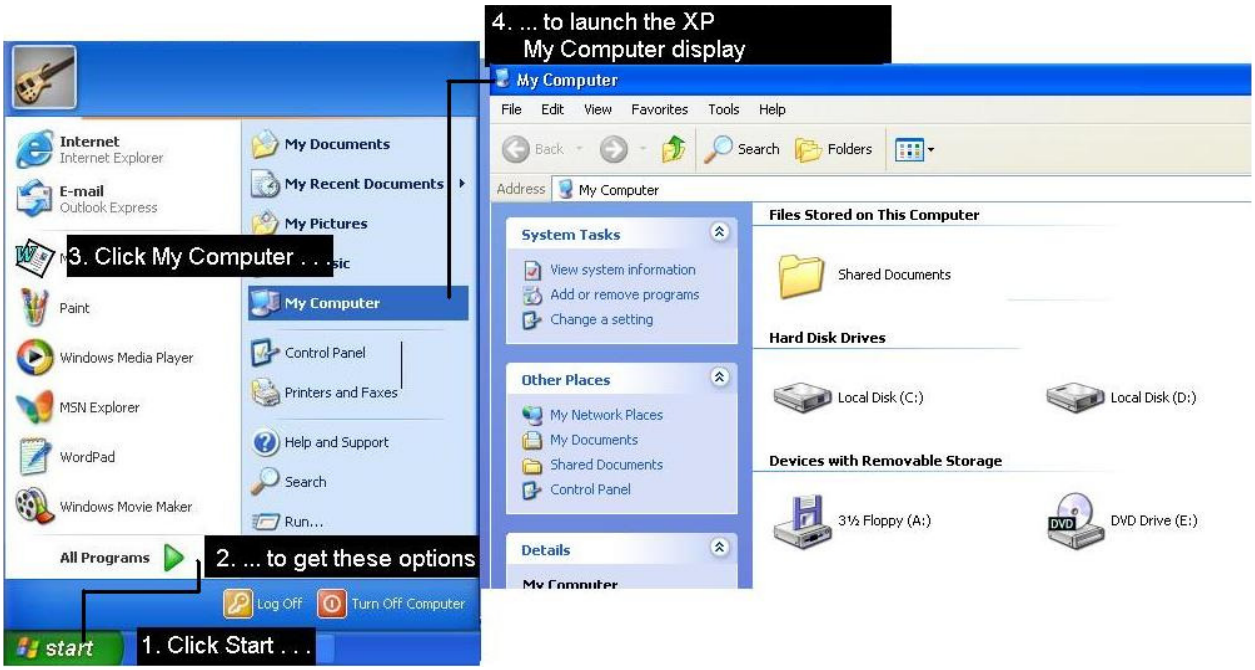
The Tools utilities let you:

—Check the media on your disk drives for errors and correct those errors.

—Backup the content of the media on a disk drive.

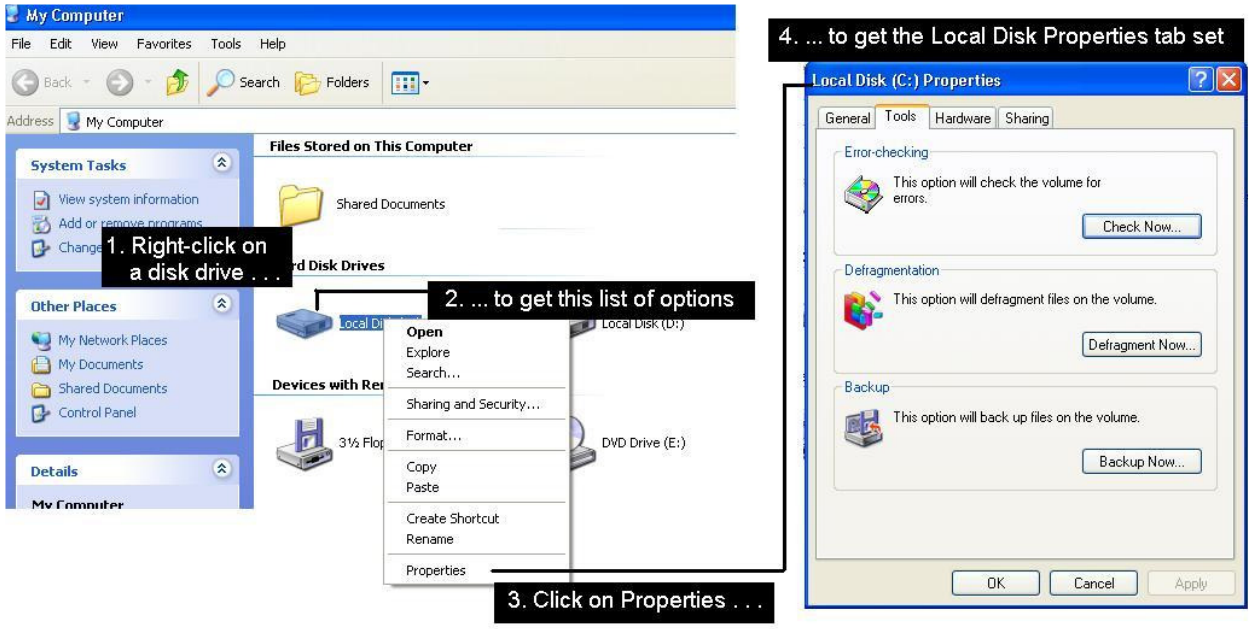
—Defragment the media on a disk drive.

To launch the Tools Utility



1. Click on the Start button on the Windows XP desktop.
   A list of options appears.

2. Click the “My Computer” item.
   The My Computer display appears.



3. Place your mouse pointer over oneof the computer's disk drives.
   Make sure the disk drive you choose has data stored on it.

4. Press the RIGHT mouse button.
   A list of options appears.

5. Click the mouse on the Properties option.
   The Local Drive Properties tab set appears.

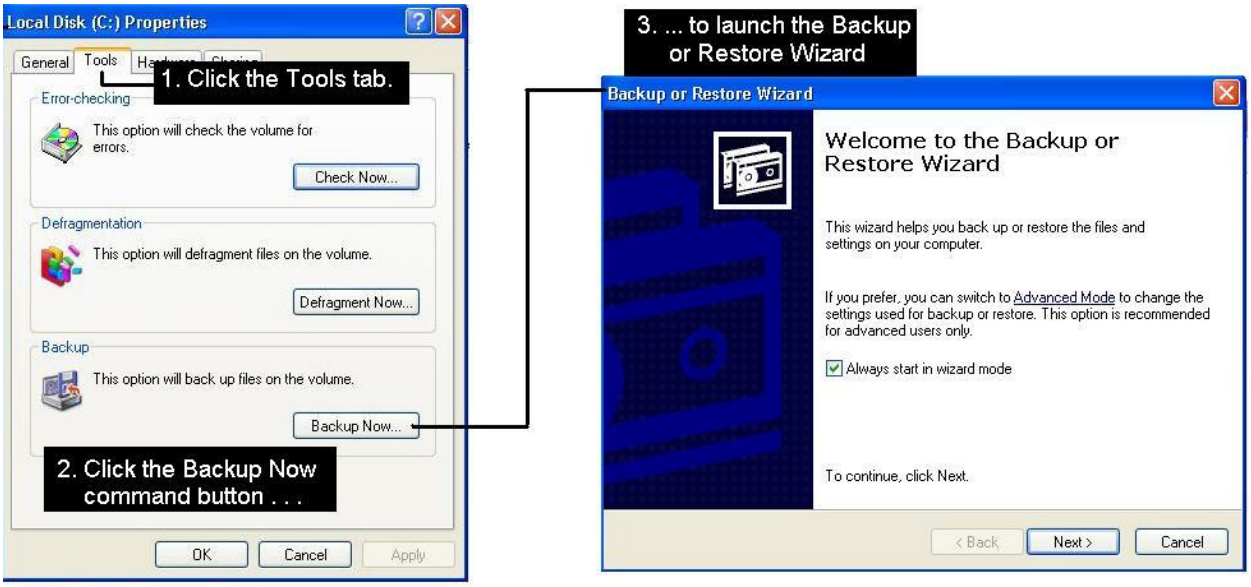
To check the disk drive for errors

The procedures for this operatuion are identical to those for Windows 2000. Please see that section of this document for details.

To defragment a disk drive

The procedures for this operatuion are identical to those for Windows 2000. Please see that section of this document for details.

To backup a disk drive


Local Disk (C:) Properties
General
Tools
1. Click the Tools tab.
Error-checking
This option will check the volume for errors.
Check Now...
Defragmentation
This option will defragment files on the volume.
Defragment Now...
Backup
This option will back up files on the volume.
Backup Now...
2. Click the Backup Now command button . . .
OK
Cancel
Apply
3. ... to launch the Backup or Restore Wizard
Backup or Restore Wizard
Welcome to the Backup or Restore Wizard
This wizard helps you back up or restore the files and settings on your computer.
If you prefer, you can switch to Advanced Mode to change the settings used for backup or restore. This option is recommended for advanced users only.
Always start in wizard mode
To continue, click Next.
< Back
Next >
Cancel

1. Launch the Local Disk Properties tab set.
   See the To launch the tools utility section of this document.

2. Click on the Tools tab.
   This brings the Tools tab to the top of the set of tabs.

3. Click on the Tools tab.
   This brings the Tools tab to the top of the tab set.

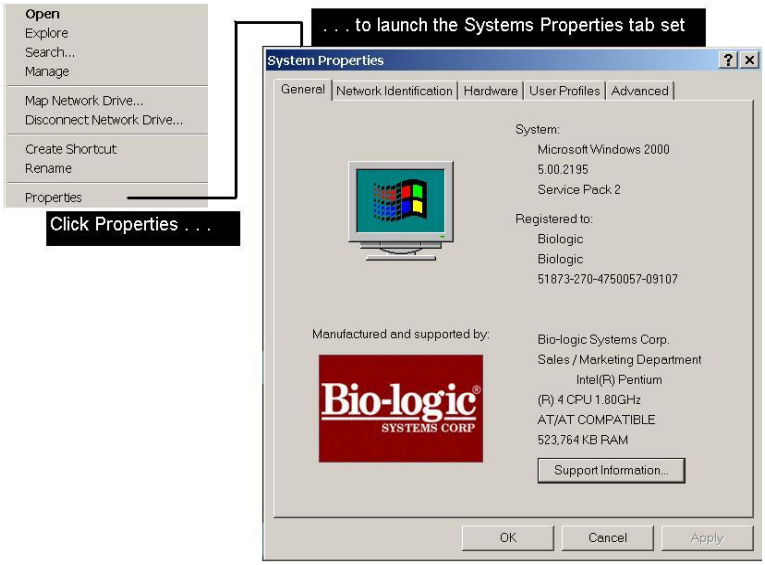
4. Click opn the Backup Now commabnd button.
   This launches the Backup or Restore Wizard.

5. Follwo the on-screen instructions within the Wizard to run the backup utility.

Other Wizard programs

Windows 2000 and Windows XP support “Wizard” programs that help you add, remove, plug, unplug, and trioubleshoot your computer systemWe present “overview” procedures for these programs below. For details, please consult the Microsoft® Corporation documentation that came with your computer system or make contact with the Microsoft® Corporation.

Windows 2000 “Wizards”

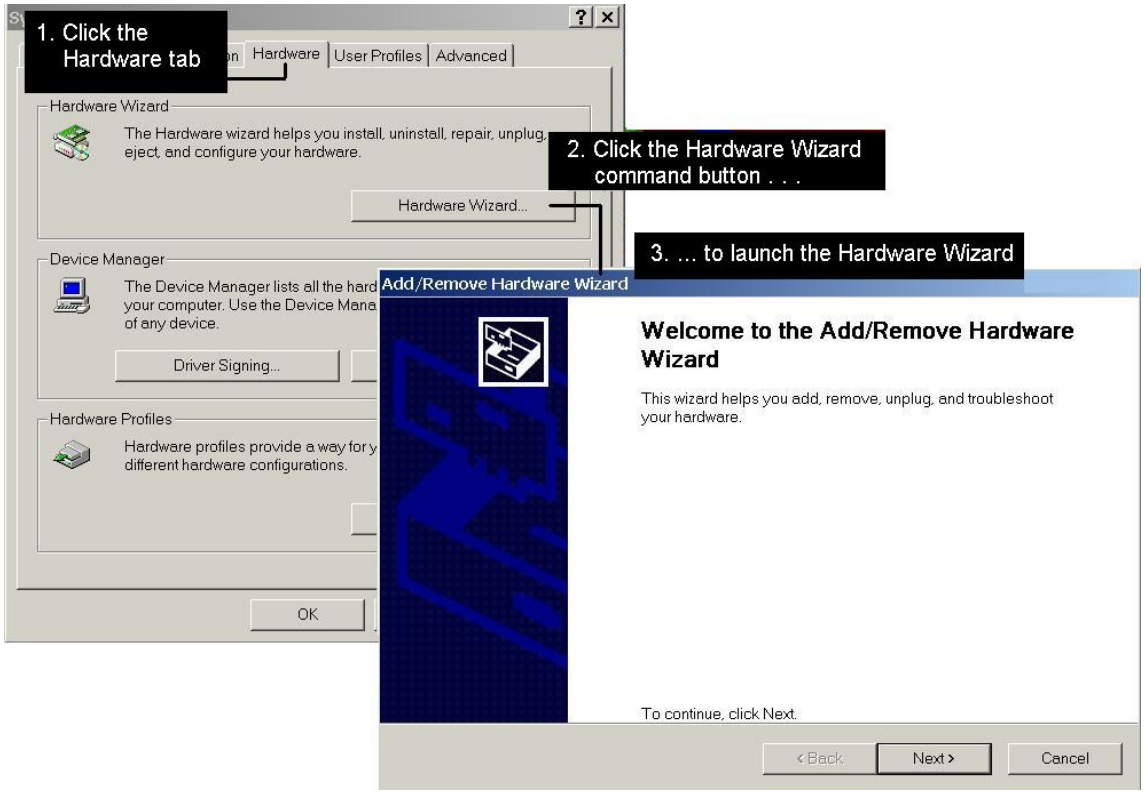


To run a hardware “Wizard” in Windows 2000:

1. Place your mouse pointer over the “My Computer” icon ( ) on the Windows 2000 desktop.

2. Press the RIGHT mouse button.
   A list of options appears.

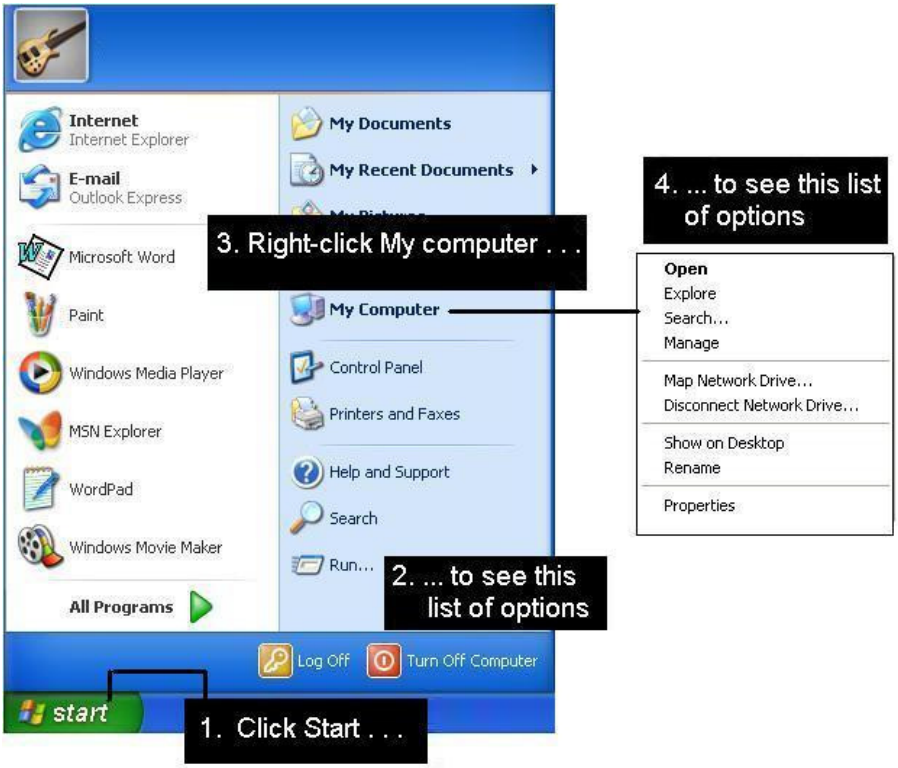
3. Click the mouse on the Properties option.
   The System Properties tab set appears.


1. Click the Hardware tab
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
2. Click the Hardware Wizard command button . . .
Hardware Wizard...
Device Manager
The Device Manager lists all the hard
your computer. Use the Device Mana
of any device.
Driver Signing...
Hardware Profiles
Hardware profiles provide a way for y
different hardware configurations.
OK
3. ... to launch the Hardware Wizard
Add/Remove Hardware Wizard
Welcome to the Add/Remove Hardware Wizard
This wizard helps you add, remove, unplug, and troubleshoot your hardware.
To continue, click Next.
< Back
Next >
Cancel

4. Click on the Hardware tab.
   This brings that tab to the "top" of the stack of tabs in the System Properties tab set.

5. Click on the Hardware Wizard command button.
   This starts the Hardware Wizard. Follow the on-screen instructions in this Wizard to perform Scandisk operations and otherwise troubleshoot your hardware.

Windows XP "Wizard"

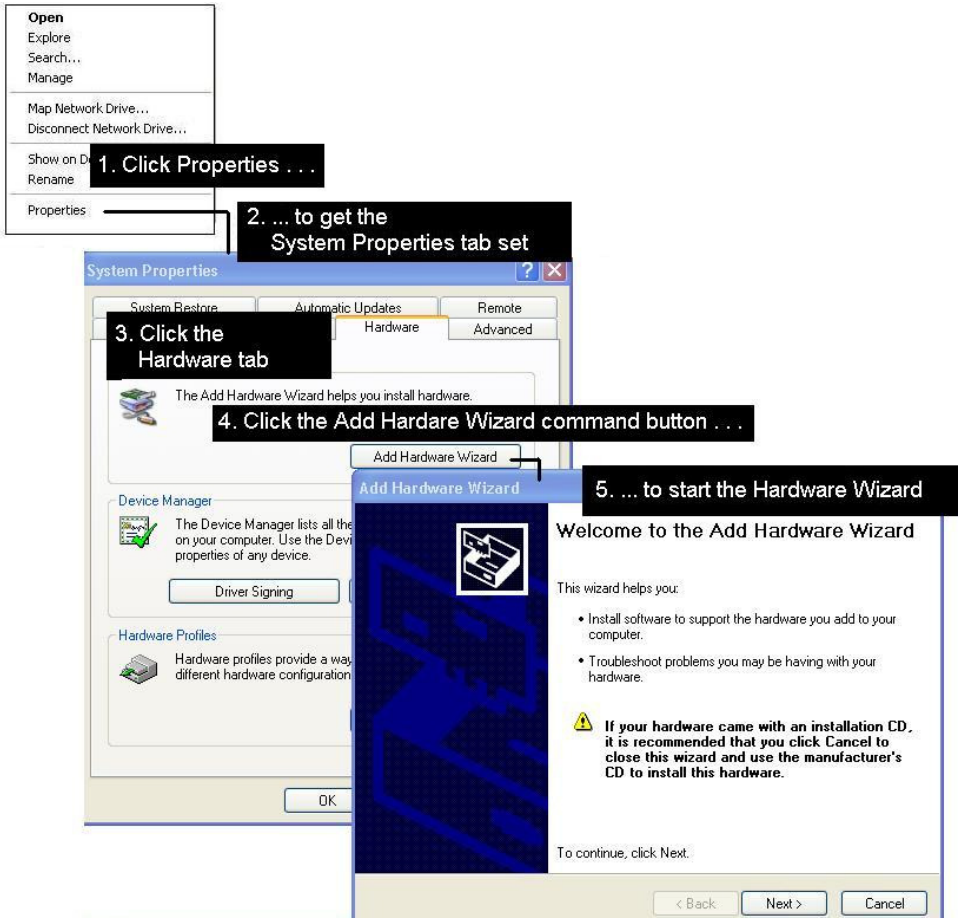


To run a hardware "Wizard" in Windows XP:

1. Click on the Start button on the Windows XP desktop.
   A list of options appears.

2. Place your mouse pointer over the "My Computer" item.

3. Press the RIGHT mouse button.
   A list of options appears.


Open
Explore
Search...
Manage
Map Network Drive...
Disconnect Network Drive...
Rename
Properties
1. Click Properties . . .
2. ... to get the System Properties tab set
System Properties
System Restore
Automatic Updates
Remote
Hardware
Advanced
3. Click the Hardware tab
The Add Hardware Wizard helps you install hardware.
4. Click the Add Hardare Wizard command button . . .
Add Hardware Wizard
Device Manager
The Device Manager lists all the
on your computer. Use the Devi
properties of any device.
Driver Signing
Hardware Profiles
Hardware profiles provide a way
different hardware configuration
OK
Add Hardware Wizard
5. ... to start the Hardware Wizard
Welcome to the Add Hardware Wizard
This wizard helps you:
• Install software to support the hardware you add to your computer.
• Troubleshoot problems you may be having with your hardware.
If your hardware came with an installation CD, it is recommended that you click Cancel to close this wizard and use the manufacturer's CD to install this hardware.
To continue, click Next.
< Back
Next >
Cancel

4. Click the mouse on the Properties option.
   The System Properties tab set appears.

5. Click on the Hardware tab.
   This brings that tab to the “top” of the stack of tabs in the System Properties tab set.

6. Click on the Add Hardware Wizard command button.
   This starts the Add Hardware Wizard. Follow the on-screen instructions in this Wizard to perform Scandisk operations and otherwise troubleshoot your hardware.

P&TI UTILITIES

This utility program lets you backup or repair Patient and Test Information databases and then save the backup or repaired version, along with a compacted version, for future use. Should a database become damaged or corrupted, you can then replace the database with a backup, repaired, or compacted version of the database depending on the version's date. This program lets you change the number of backup folders, repair folders, and log files available for use.

How to launch the P&TI Utilities program

To start the P&TI Utilities program, follow these steps:

1. Launch Sleepscan or Ceegraph program.
2. Select (click on) the Tools menu.

   A drop-down list of menu items appears.
3. Select (click on) the PTI Utilities item.

   The P&TI Utilities display appears.

How to use the P&TI Utilities program

You can use the P&TI Utilities program:

To backup databases.

To repair databases.

To restore databases.

To handle advanced options.

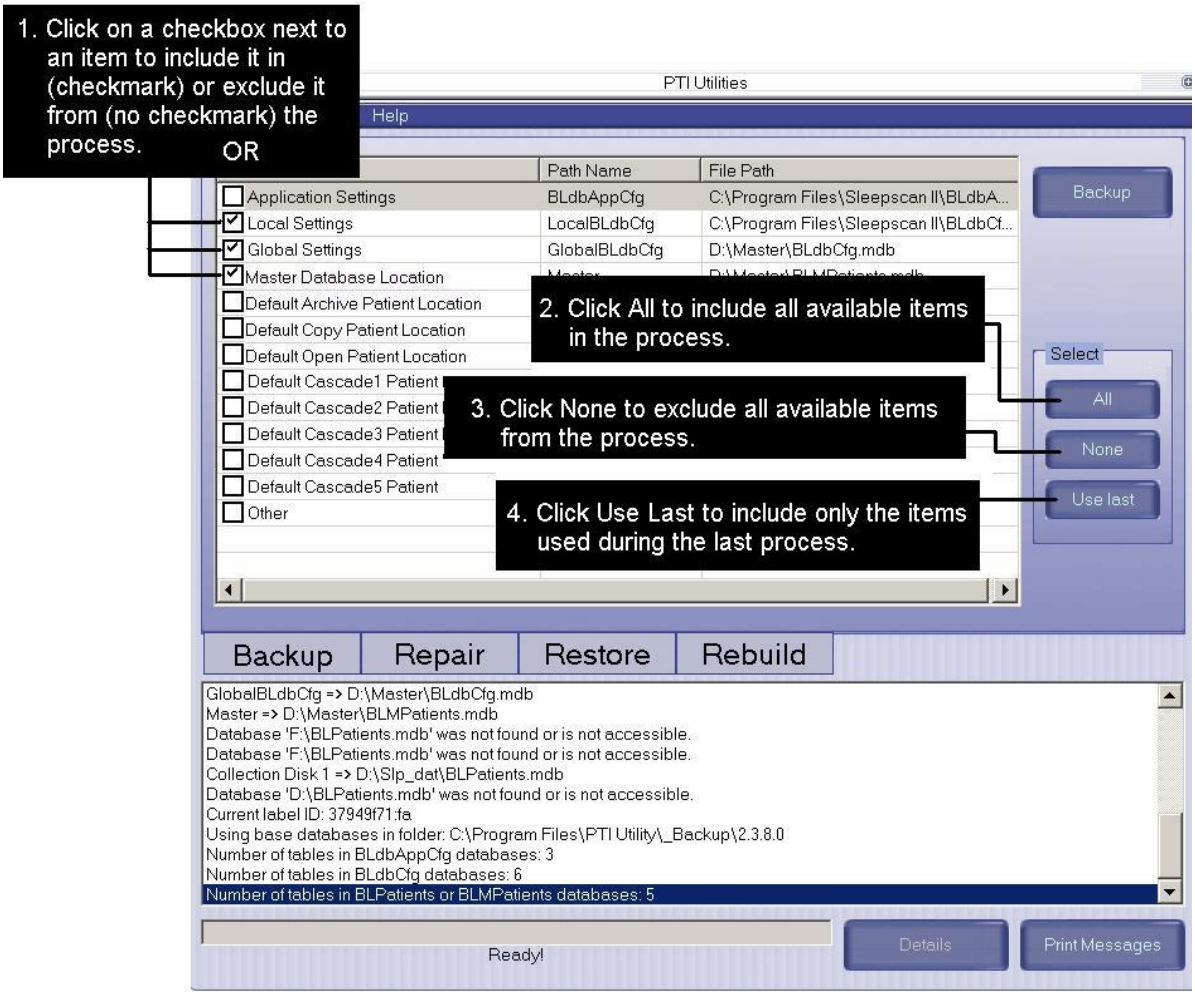
To view and print details about database backup, repair, or restoration.

To print program messages.

Details follow.

Note: Sample illustrations depict data from the Sleepscan II Analysis program. Procedures are identical for the Ceegraph program.

To backup databases:



You can perform the backup function from the Backup tab of the P&TI Utilities display screen. This function creates backup databases and compact versions of databases in the Patient and Test Information database program without altering the original databases. To backup one or more databases at the same time:

1. Launch the P&TI Utilities program.
2. Select (click on) the Backup tab.

   This brings that tab and its controls to the front of the P&TI Utilities display screen.
3. Select (click on) the checkbox next to a database to include that database in (checkmark appears) or exclude that database from (no checkmark appears) the backup process.

   OR

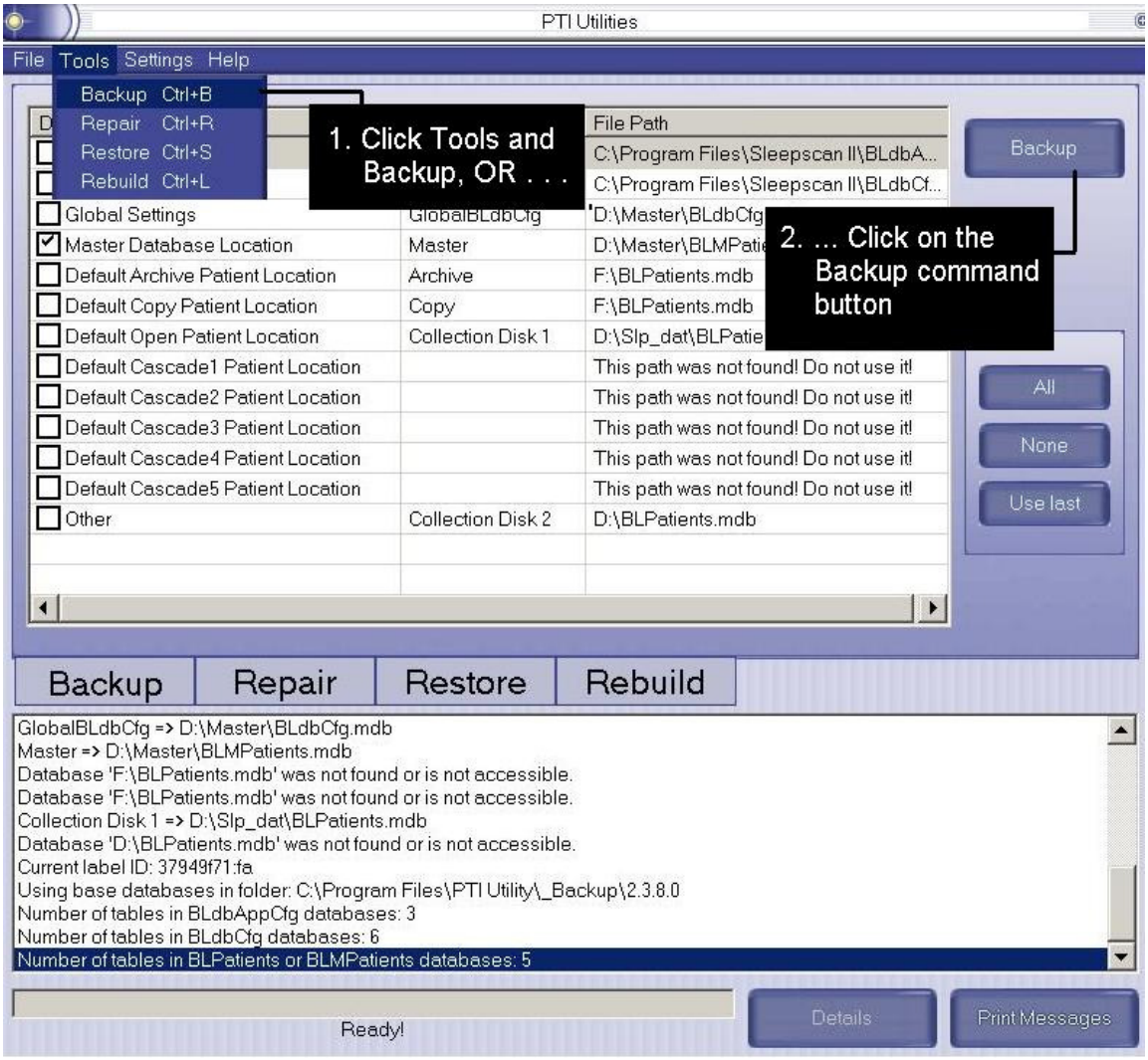
4. Click on the All command button to include all available databases in the backup process.

   OR

5. Click on the None command button to exclude all databases from the backup process.

   OR

6. Click on the Use last command button to include only the data bases used during the last backup process.



7. Select (click on) the Tools menu.

   A drop-down list of menu items appears.

8. Select (click on) the Backup item from that list

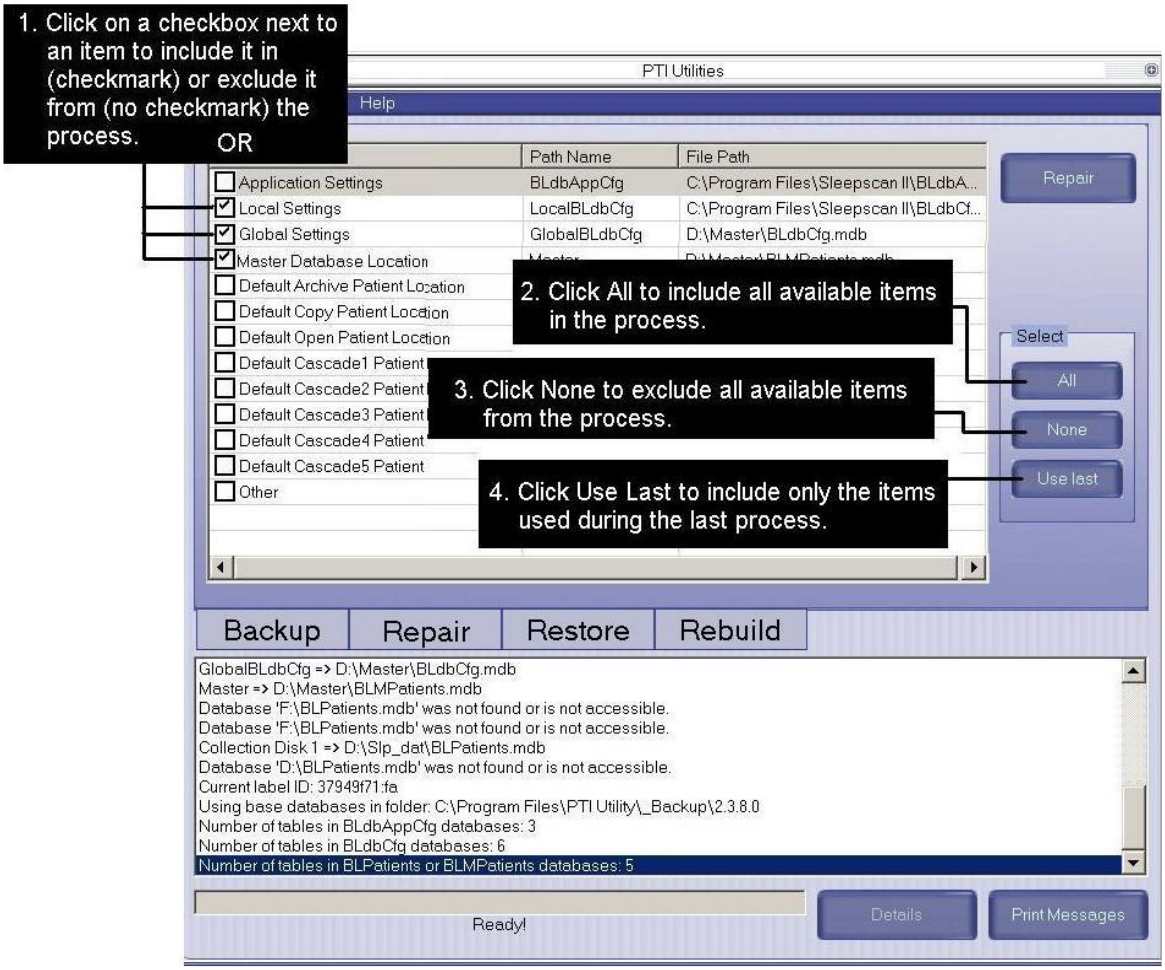
   OR

9. Click on the Backup command button.

   The P&TI Utilities program executes the Backup process.

Note: During backup, the program automatically lists progress and error information in the message section at the bottom of the P&TI Utilities display. Once backup is complete, you print this information by clicking the Print Messages command button.

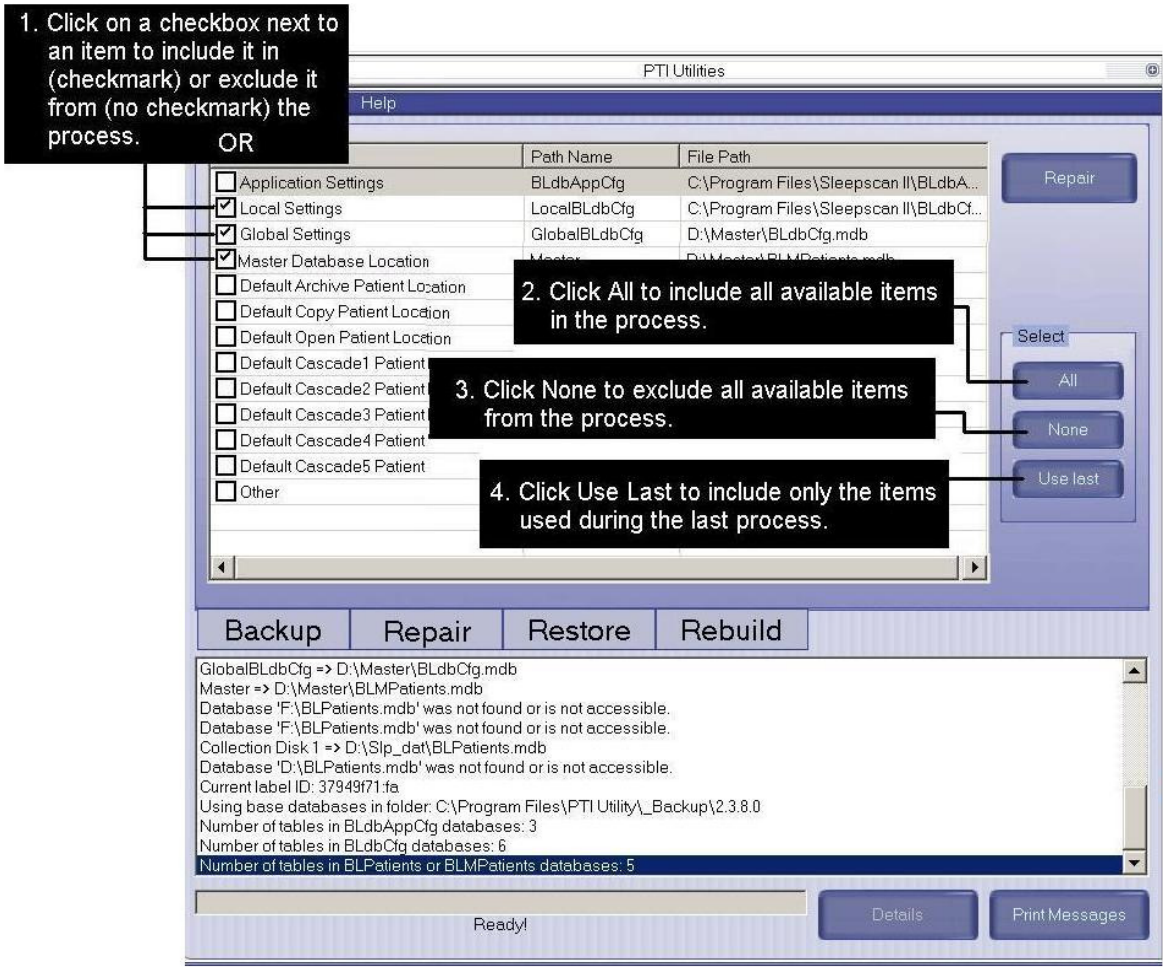
To repair databases:



You can perform the repair function from the Repair tab of the P&TI Utilities display screen. This function repairs damaged database(s) by copying the database(s) you select in the P&TI Utilities' database table display and replacing the damaged database(s) with a repaired version. To repair one or more databases at the same time:

1. Launch the P&TI Utilities program.
2. Select (click on) the Repair tab.

   This brings that tab and its controls to the front of the P&TI Utilities display screen.



3. Select (click on) the checkbox next to a database to include that database in (checkmark appears) or exclude that database from (no checkmark appears) the repair process.

   OR

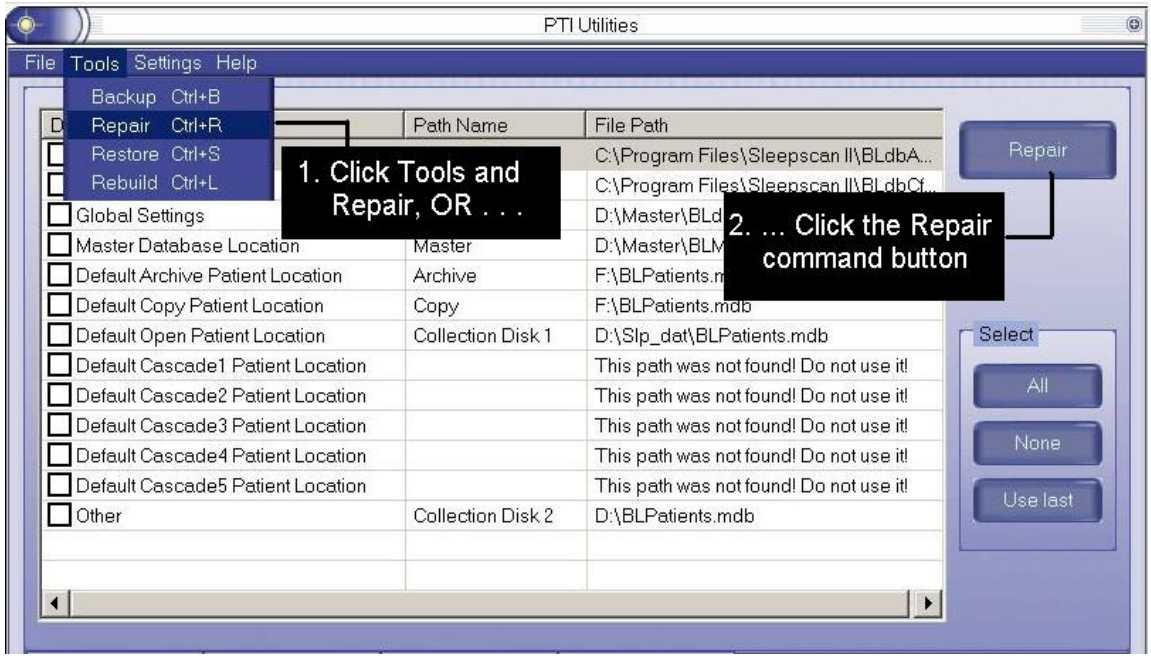
4. Click on the All command button to include all available databases in the repair process.

   OR

5. Click on the None command button to exclude all databases from the repair process.

   OR

6. Click on the Use last command button to include only the data bases used during the last repair process.



7. Select (click on) the Tools menu.

   A drop-down list of menu items appears.

8. Select (click on) the Repair item from that list

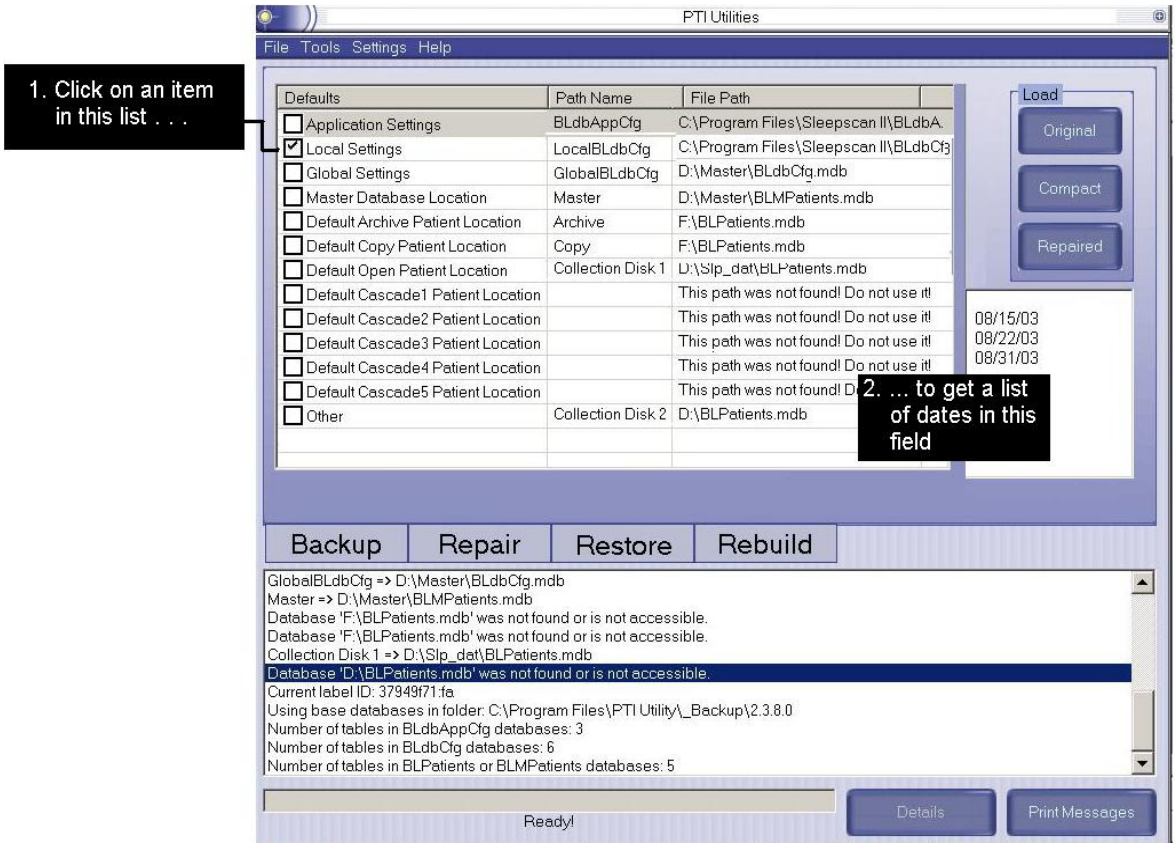
   OR

9. Click on the Repair command button.

   The P&TI Utilities program compares all records in the selected database(s) and makes sure that the patient IDs in the local databases match the corresponding Master Database records. It then proceeds with the repair process.

Note: During repair, the program automatically lists progress and error information in the message section at the bottom of the P&TI Utilities display. Once repair is complete, you print this information by clicking the Print Messages command button.

To restore databases:



You can perform the restore function from the Restore tab of the P&TI Utilities display screen. This function lets you view the backup and repair dates for any database in the displayed table and replace it with a version that you saved or repaired on an alternate date. To load a database that you repaired or backed up on a specific date:

1. Launch the P&TI Utilities program.

   See How to launch the P&TI Utilities program.

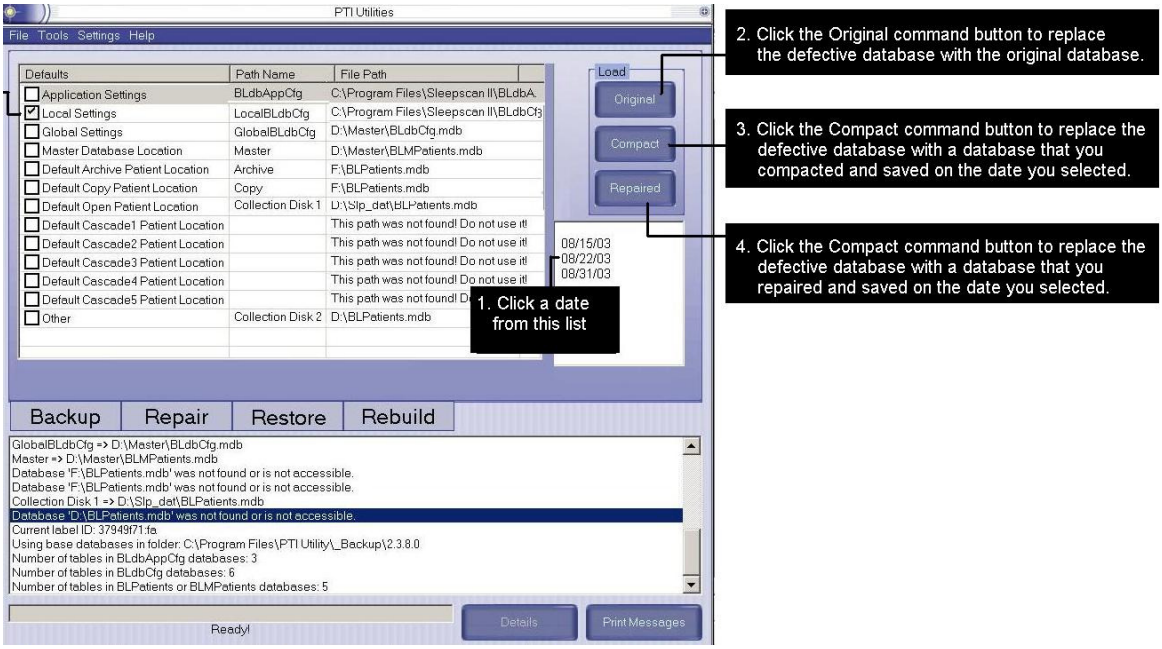
2. Select (click on) the Restore tab.

   This brings that tab and its controls to the front of the P&TI Utilities display screen

3. Click on (highlight) the database that you want to restore in the database table display.

   In the lower, right corner of the tab, the program lists backup or repair dates for the database you selected.

4. Click on (highlight) the date of the backup or repair you want to use.



Note: The program automatically "ghosts out" (deactivates) either the Compact or Repaired button, depending on which function was performed on the selected date.

5. Select (click on) the Tools menu.

   A drop-down list of menu items appears.

6. Select (click on) the Restore item from that list

   OR

7. Click on the Original command button.

   The P&TI Utilities program replaces the defective database with the original database on a given day.

   OR

8. Click on the Compact command button.

   The P&TI Utilities program replaces the defective database with a database that you compacted.

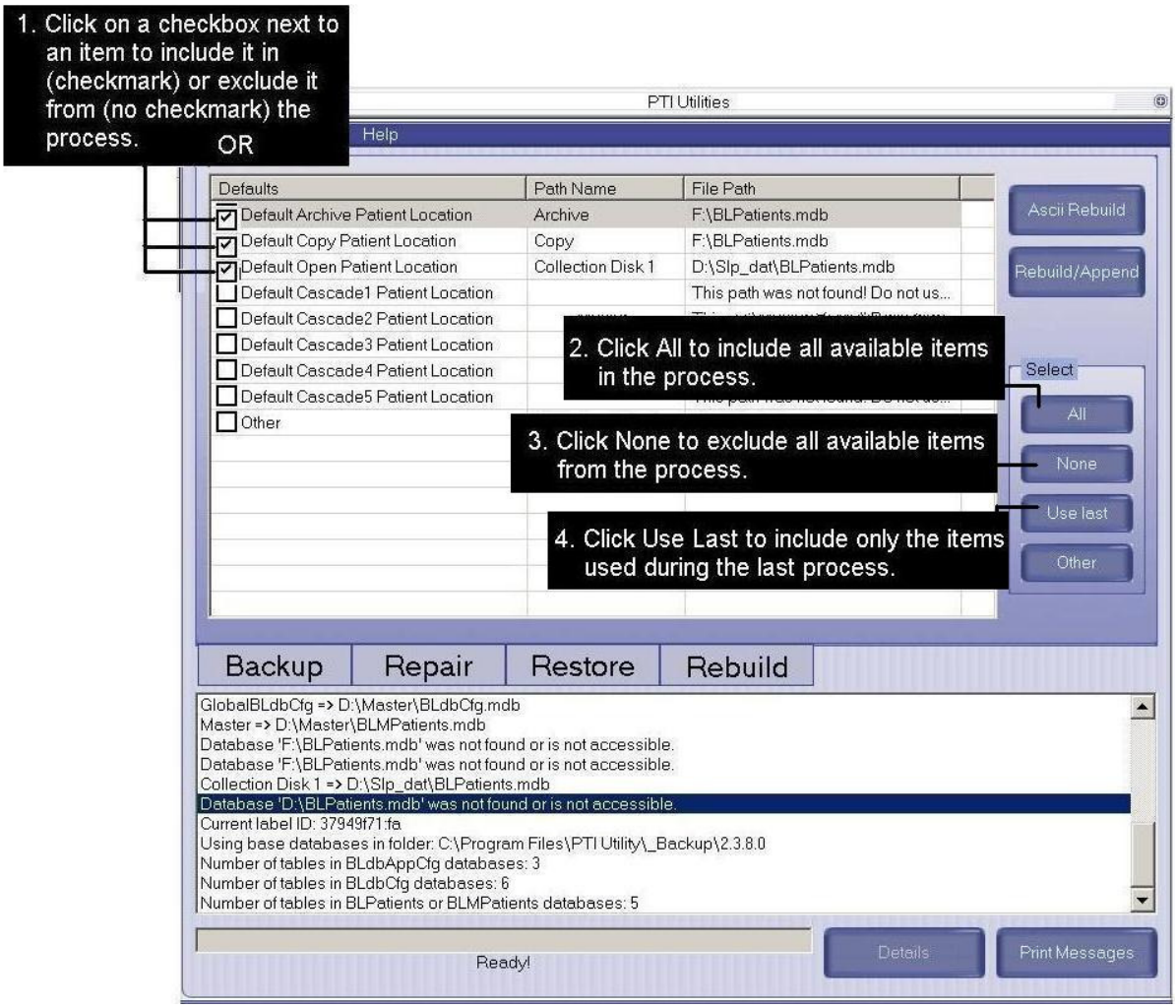
9. Click on the Repaired command button..

   The P&TI Utilities program replaces the defective database with a database that you repaired.

10. Check the confirmation message to make sure that the program is loading the file you want.

11. Click "Yes" to replace the defective database with the database you stored or repaired.

To rebuild databases:


1. Click on a checkbox next to an item to include it in (checkmark) or exclude it from (no checkmark) the process.
OR
PTI Utilities
Help
Defaults
Path Name
File Path
Default Archive Patient Location
Archive
F:\BLPatients.mdb
Default Copy Patient Location
Copy
F:\BLPatients.mdb
Default Open Patient Location
Collection Disk 1
D:\Slp_dat\BLPatients.mdb
Default Cascade1 Patient Location
This path was not found! Do not us...
Default Cascade2 Patient Location
Default Cascade3 Patient Location
Default Cascade4 Patient Location
Default Cascade5 Patient Location
Other
Ascii Rebuild
Rebuild/Append
2. Click All to include all available items in the process.
Select
All
3. Click None to exclude all available items from the process.
None
Use last
4. Click Use Last to include only the items used during the last process.
Other
Backup
Repair
Restore
Rebuild
GlobalBLdbCfg => D:\Master\BLdbCfg.mdb
Master => D:\Master\BLMPatients.mdb
Database 'F:\BLPatients.mdb' was not found or is not accessible.
Database 'F:\BLPatients.mdb' was not found or is not accessible.
Collection Disk 1 => D:\Slp_dat\BLPatients.mdb
Database 'D:\BLPatients.mdb' was not found or is not accessible.
Current label ID: 37949f71:fa
Using base databases in folder: C:\Program Files\PTI Utility_Backup\2.3.8.0
Number of tables in BLdbAppCfg databases: 3
Number of tables in BLdbCfg databases: 6
Number of tables in BLPatients or BLMPatients databases: 5
Ready!
Details
Print Messages

You can perform the rebuild function from the Rebuild tab of the P&TI Utilities display screen. This function rebuilds damaged database(s) by copying either ASCII backup files or the patient information in file headers. To rebuild one or more databases at the same time:

1. Launch the P&TI Utilities program.
2. Select (click on) the Rebuild tab.

   This brings that tab and its controls to the front of the P&TI Utilities display screen.
3. Select (click on) the checkbox next to a database to include that database in (checkmark appears) or exclude that database from (no checkmark appears) the rebuild process.

   OR

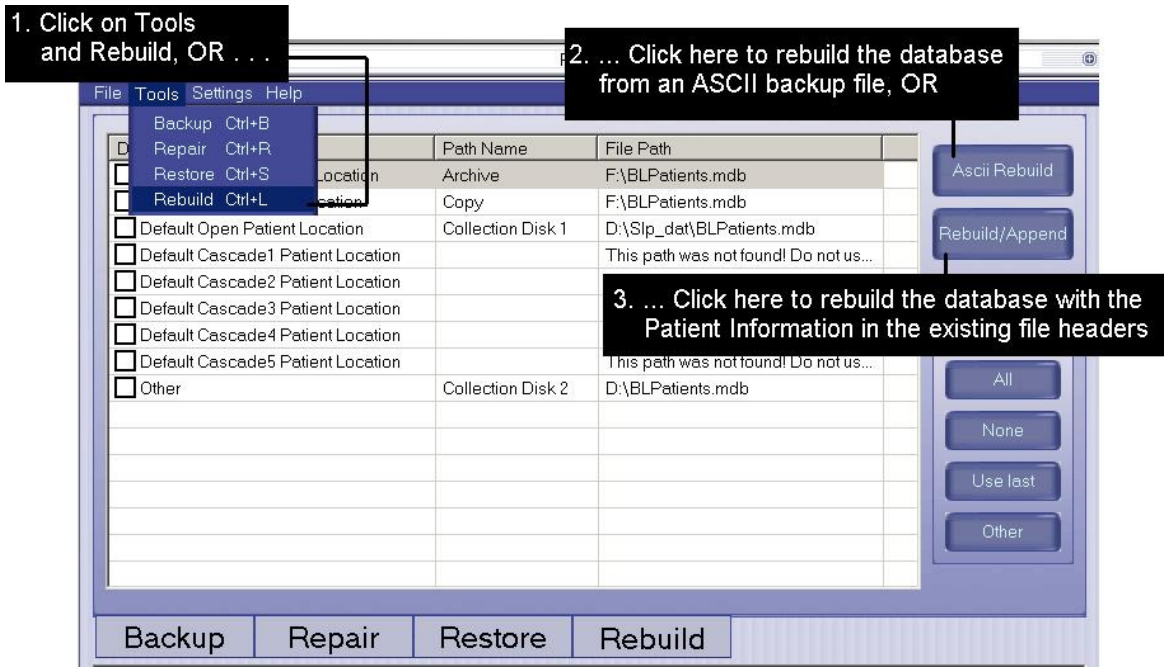
4. Click on the All command button to include all available databases in the rebuild process.

   OR

5. Click on the None command button to exclude all databases from the rebuild process.

   OR

6. Click on the Use last command button to include only the data bases used during the last rebuild process.



7. Select (click on) the Tools menu.

   A drop-down list of menu items appears.

8. Select (click on) the Rebuild item from that list

   OR

9. Click on the ASCII Rebuild command button.

   The "This option will rebuild/replace the database in the selected location. Use this option only if you have suffered catastrophic data loss! Do you wish to continue?" message appears.

   —Click the Yes option.

   The program rebuilds all the databases that you have selected in the tab menu table with ASCII backup files. The program creates and updates these files as each patient record was created and updated.

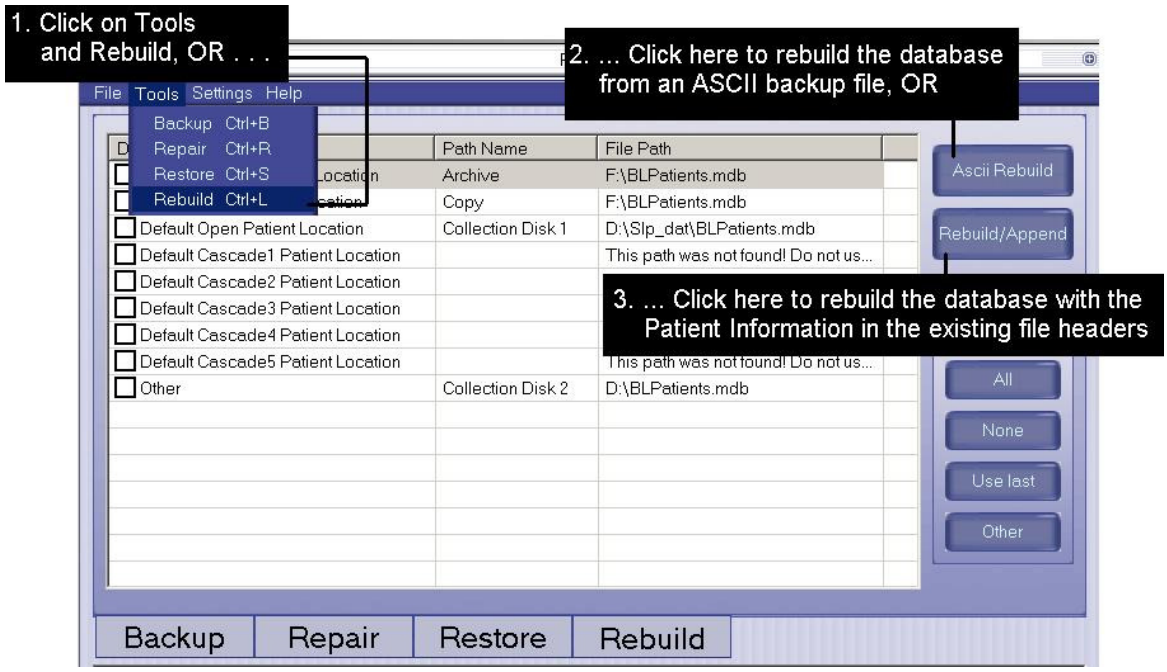
Note: The program displays the "No ASCII files found in the selected Location." message if the ASCII backup folder contains no ASCII files.

OR

—Clck the No option.

This closes the message and returns to the P&TI Utilities tab menu.

OR



10. Click on the Rebuild/Append command button.

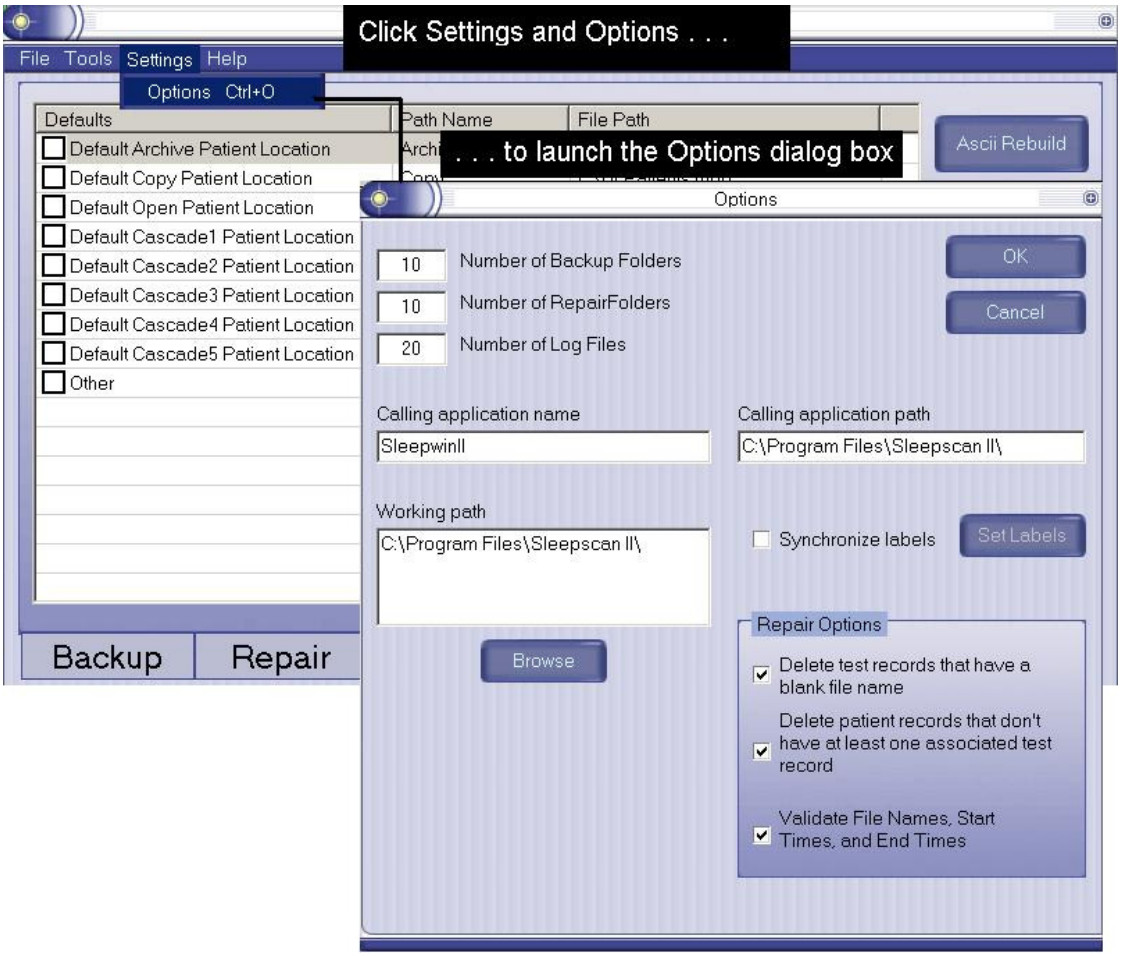
    The program rebuilds all the databases that you have selected in the tab menu table with the patient information in the existing file headers. Databases created by this method contain only the information in the file header entries. During a rebuild, the program automatically records all patient and test files to a new database or any previously unlisted patient and test files to an existing database. The program displays the message: "No EEG files found in selected location" if files don't exist. If this should occur, users can select OK to exit the message and return to the Database Rebuild Utility dialog.

Note: Neither option is available for rebuilding a Master Database. If necessary, use the Archive-to-Archive feature in the P&TI program to rebuild a damaged or missing Master Database.

To handle advanced options:

The Settings menu of the PTI Utilities display contains the Options menu item. This menu item launches the P&TI Utilities Options dialog box. This dialog box lets you change the number of backup folders, repair folders, and log files for the P&TI program. It also lets you change the name of the calling application or change the working data path of a selected database.

— *Launching the P&TI Utilities Options dialog box*

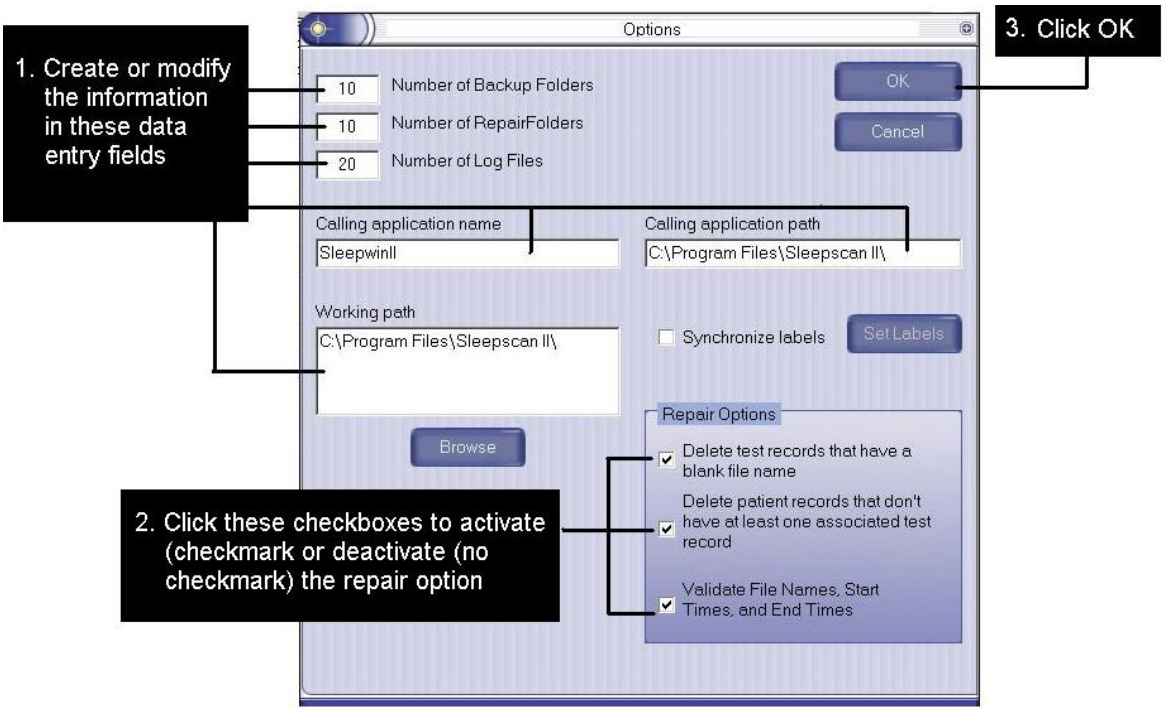


1. Launch the P&TI Utilities program.
2. Select (click on) the Settings menu.

   A drop-down list of menu items appears.
3. Select (click on) the Options item.

   The P&TI Utilities Options dialog box appears.

— Using the P&TI Utilities Options dialog box



1. Select (click on) any of the data entry fields.

   This places a text cursor in the field you selected.

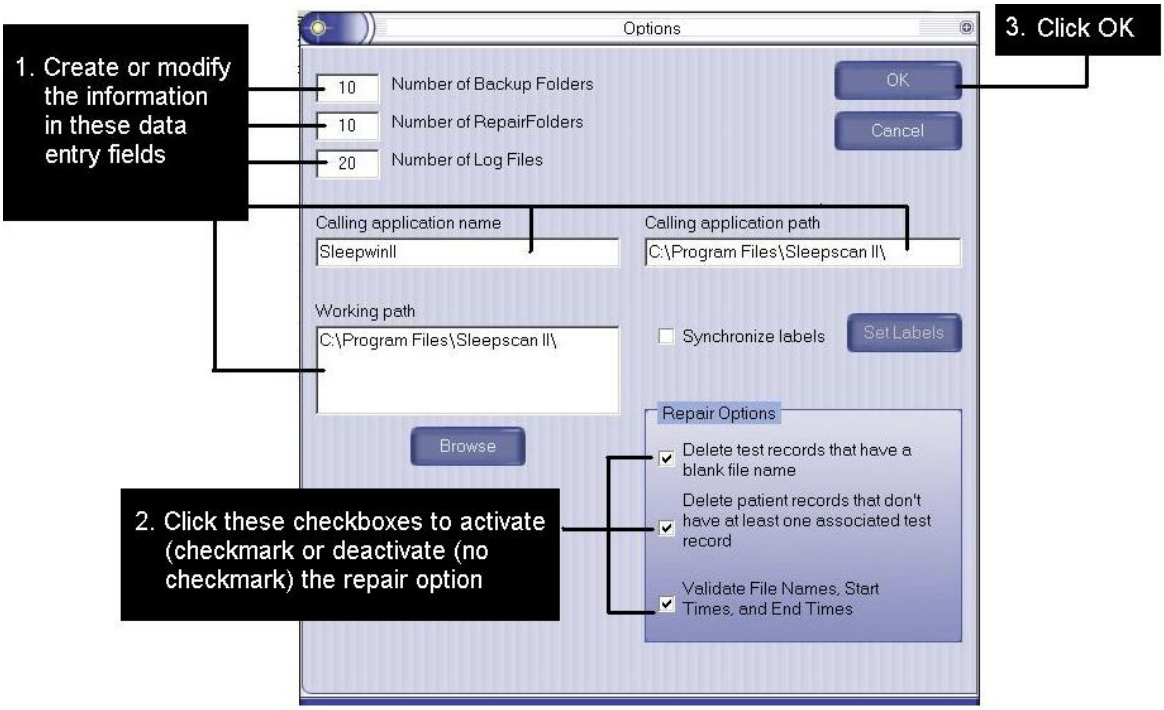
2. Use the computer keyboard to replace the data in the field you selected.

3. Repeat these steps until you have changed all of the information you want to change.

Note: If you change the name of the Calling Application, the program includes this new name in the header of each log file. If you change the data path, the program includes this new data path in the header of each log file.

If you use the Browse button to change the data path, the program launches a standard, Windows browse dialog box. For instructions about how to use that dialog box, see the Windows documentation that came with your computer.

4. Select (click on) the boxes next to the repair options to activate (checkmark) or deactivate (no checkmark) those options during the repair process.



5. Select (click on) the OK command button.

   This closes the dialog box. The program uses the settings you have selected.

   OR

6. Select (click on) the Cancel command button.

   This closes the dialog box without changing settings.

Note: The Synchronize Labels checkbox and the Set Labels command button are under development. For information about these features, make contact with Natus Medical Incorporated Customer Support at 1-800323-8326.

To view and print details:

The Details command button on the P&TI Utilities display lets you open and view files that the program deleted during a backup or repair function. To use the Details command button:

1. Launch the P&TI Utilities program.

2. Perform the backup or repair function, if necessary.

   See To backup databases and To restore databases.

3. Select (click on) the Details command button.

   The program lists deleted records and displays the contents of each deletion in a Notepad window.

4. Use the Notepad program to print details.

To print program messages:

The Print Messages command button on the P&TI Utilities display lets you print out all modifications made to the original database(s) during backup, repair, or restoration. To use the Print Messages command button:

1. Launch the P&TI Utilities program.

   See How to launch the P&TI Utilities program.

2. Click on (highlight) the database that you want from the list in the Tab.

   All modifications for the database you select appear in the message area at the bottom of the P&TI Utilities display.

3. Select (click on) the Print Messages command button.

   The program prints all the entries in the message area.

The Event Viewer utility

Windows 2000 Event Viewer: Overview

Event Viewer lets you view and manage system, program, and security events on your computer. Event Viewer displays these types of events:

Error: A significant problem, such as loss of data or loss of functionality. For example, if a service fails to load during startup, an error will be logged.

Warning: An event that is not necessarily significant, but may indicate a possible future problem. For example, when disk space is low, a warning will be logged.

Information: An event that describes the successful operation of an application, driver, or service. For example, when a network driver loads successfully, an Information event will be logged.

Success Audit: An audited security access attempt that succeeds. For example, a user's successful attempt to log on to the system will be logged as a Success Audit event.

Failure Audit: An audited security access attempt that fails. For example, if a user tries to access a network drive and fails, the attempt will be logged as a Failure Audit event.

Event Viewer uses an Event Log service to gather information about hardware, software, and system problems and monitor Windows 2000 security events. This service starts automatically when you start Windows 2000. Using the event logs in Event Viewer, Windows 2000 records events in three kinds of logs:

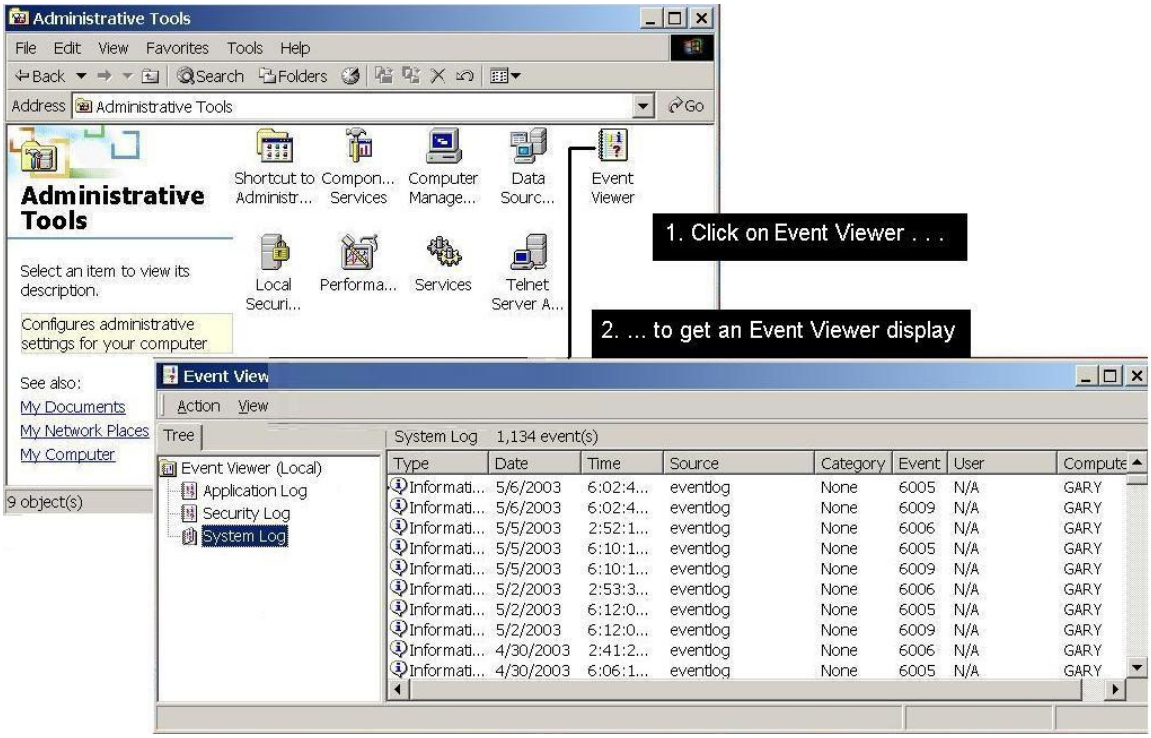
Application log: The application log contains events logged by applications or programs. For example, a database program might record a file error in the application log. The developer decides which events to record.

System log: The system log contains events logged by the Windows 2000 system components. For example, the failure of a driver or other system component to load during startup is recorded in the system log. The event types logged by system components are predetermined.

Security log: The security log can record security events such as valid and invalid logon attempts, as well as events related to resource use, such as creating, opening, or deleting files. An administrator can specify what events are recorded in the security log. For example, if you have enabled logon auditing, attempts to log on to the system are recorded in the security log.

Note: All users can view application and system logs, but security logs are accessible only to administrators. By default, security logging is turned off. You can use Group Policy to enable security logging. The administrator can also set auditing policies in the registry that cause the system to halt when the security log is full.

Using Event Viewer


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
My Network Places
My Computer
9 object(s)
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
Services
Telnet Server A...
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

Event Viewer maintains logs about program, security, and system events on your computer. You can use Event Viewer to view and manage the event logs, gather information about hardware and software problems, and monitor Windows 2000 security events. To reach Event Viewer:

1. Click Start.

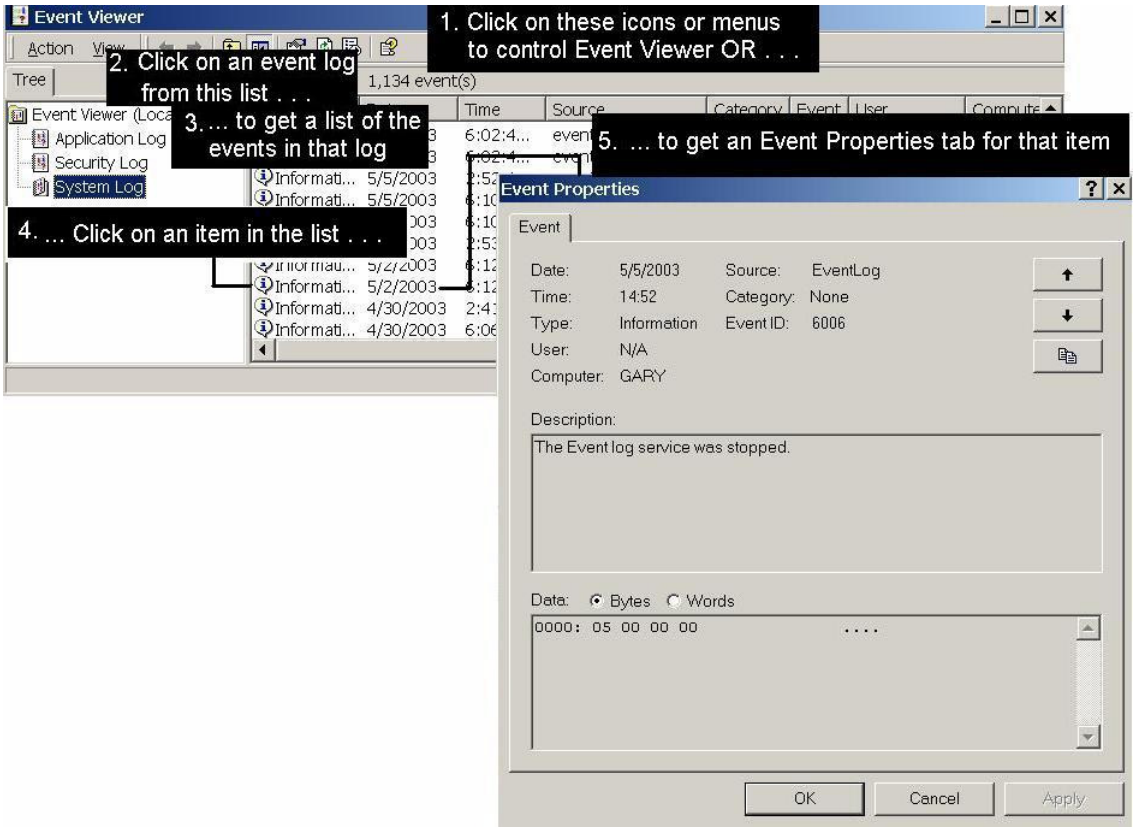
2. Point to Settings

3. Click Control Panel.

4. Double-click **Administrative Tools**.
   The **Administrative Tools** display appears.

5. Select (click on) the Event Viewer icon.
   This launches the Event Viewer display.

To view more details about an event


Event Viewer
1. Click on these icons or menus to control Event Viewer OR . . .
2. Click on an event log from this list . . .
3. . . . to get a list of the events in that log
4. . . . Click on an item in the list . . .
5. . . . to get an Event Properties tab for that item
Event Properties
Event
Date: 5/5/2003
Source: EventLog
Time: 14:52
Category: None
Type: Information
Event ID: 6006
User: N/A
Computer: GARY
Description:
The Event log service was stopped.
Data: Bytes Words
0000: 05 00 00 00
OK
Cancel
Apply

1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

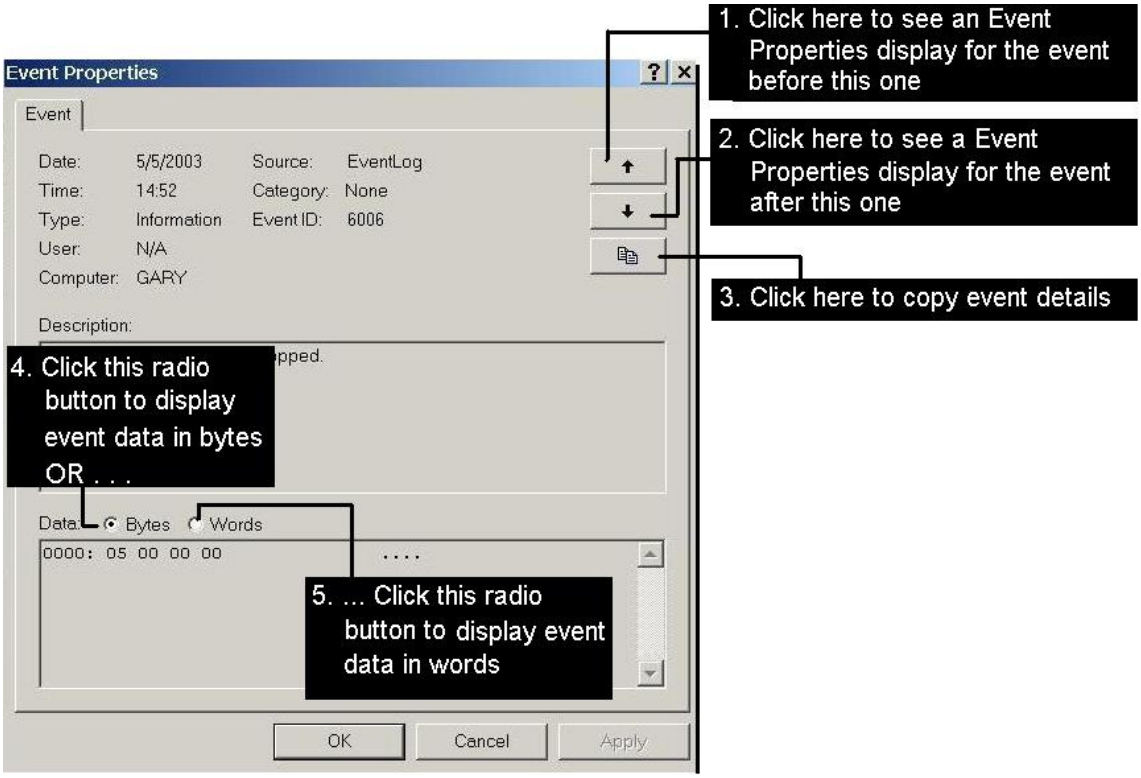
2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To search for specific types of events
   — To clear an event log
   — To archive an event log
   — To open an archived event log
   — To free an event log when it is full

   OR

3. Click on the log you want from the Tree area of the display.
   A list of the events in that log appears.

4. Select (click on) the event you want from that list.
   An Event Properties display appears for the item that you selected.


1. Click here to see an Event Properties display for the event before this one
2. Click here to see a Event Properties display for the event after this one
3. Click here to copy event details
Event Properties
Event
Date: 5/5/2003 Source: EventLog
Time: 14:52 Category: None
Type: Information Event ID: 6006
User: N/A
Computer: GARY
Description:
4. Click this radio button to display event data in bytes OR . . .
Data: Bytes Words
0000: 05 00 00 00 ....
5. … Click this radio button to display event data in words
OK
Cancel
Apply

5. Click on the up arrow on the Event Properties display.
   This closes the current Event Properties display and opens the Event Properties display for the event prior to this one in the event log you selected.

   OR

6. Click on the down arrow on the Event Properties display.
   This closes the current Event Properties display and opens the Event Properties display for the event after this one in the event log you selected.

7. Click on the Copy icon ( ).
   This copies the details of the event you are viewing to the computer's clipboard. You can paste that information in another application.

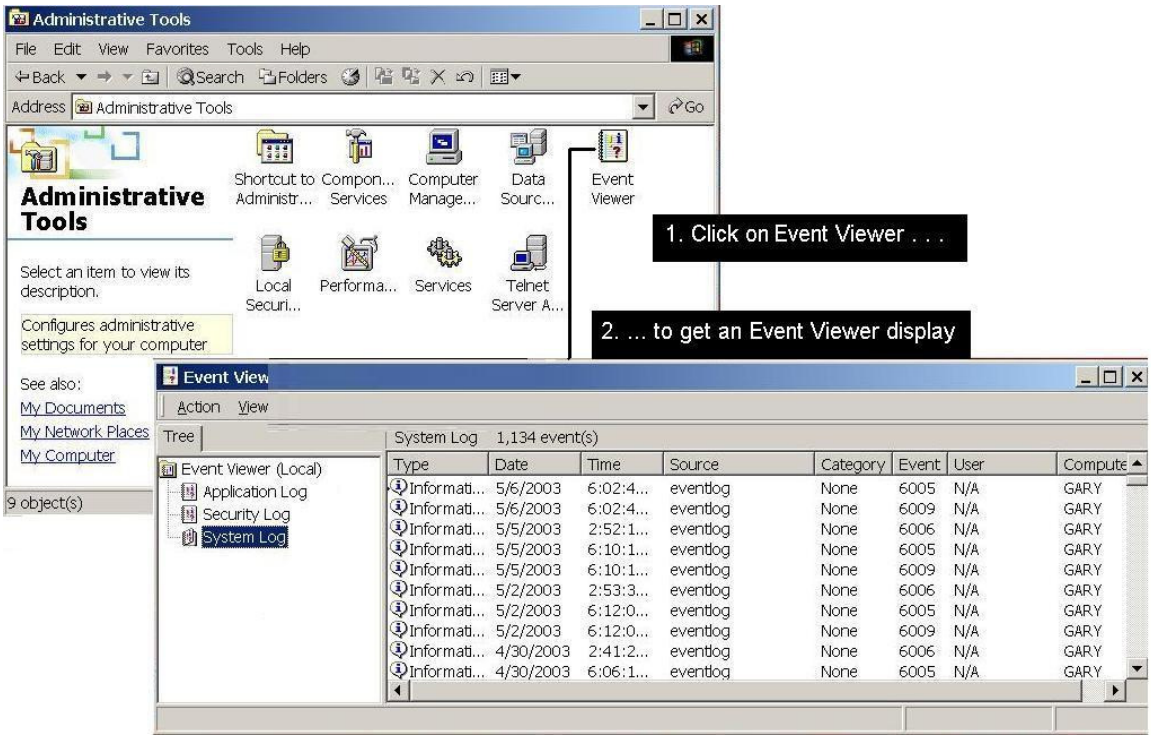
8. Click the Bytes radio button (bullet appears).
   The data in the display area appears in bytes format.

   OR

9. Click the Words radio button (bullet appears).
   The data in the display area appears in words format.

Note: Not all events generate binary data. Only experienced programmers or a support technician familiar with the source application can interpret binary data. To retain the event description in binary data form, archive logs in the log file format (*.evt). Saving logs in text format (*.txt) or comma-delimited text format (*.csv) discards the binary data. See To archive an event log.

To search for specific types of events

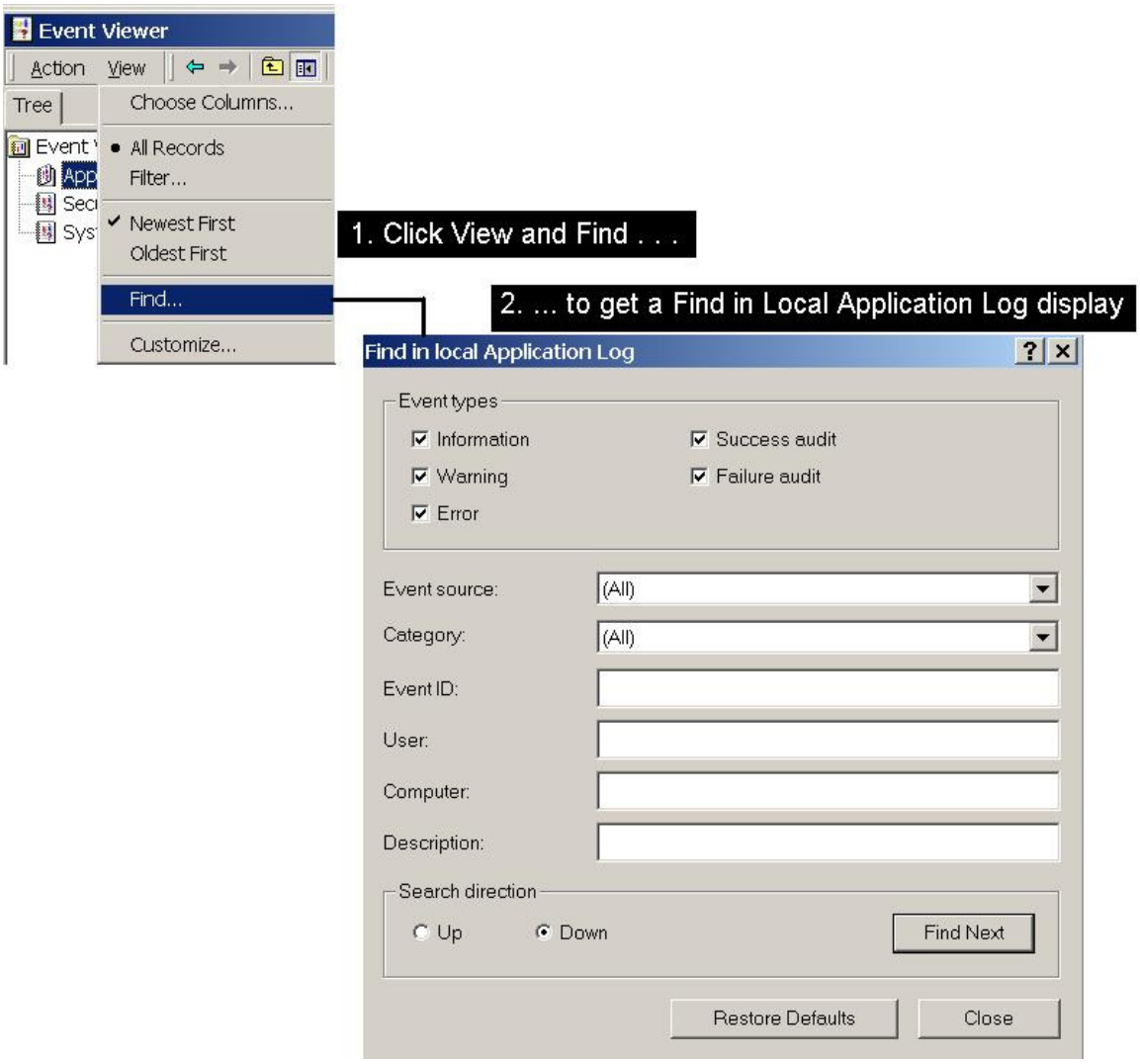

Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
My Network Places
My Computer
9 object(s)
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
Services
Telnet Server A...
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

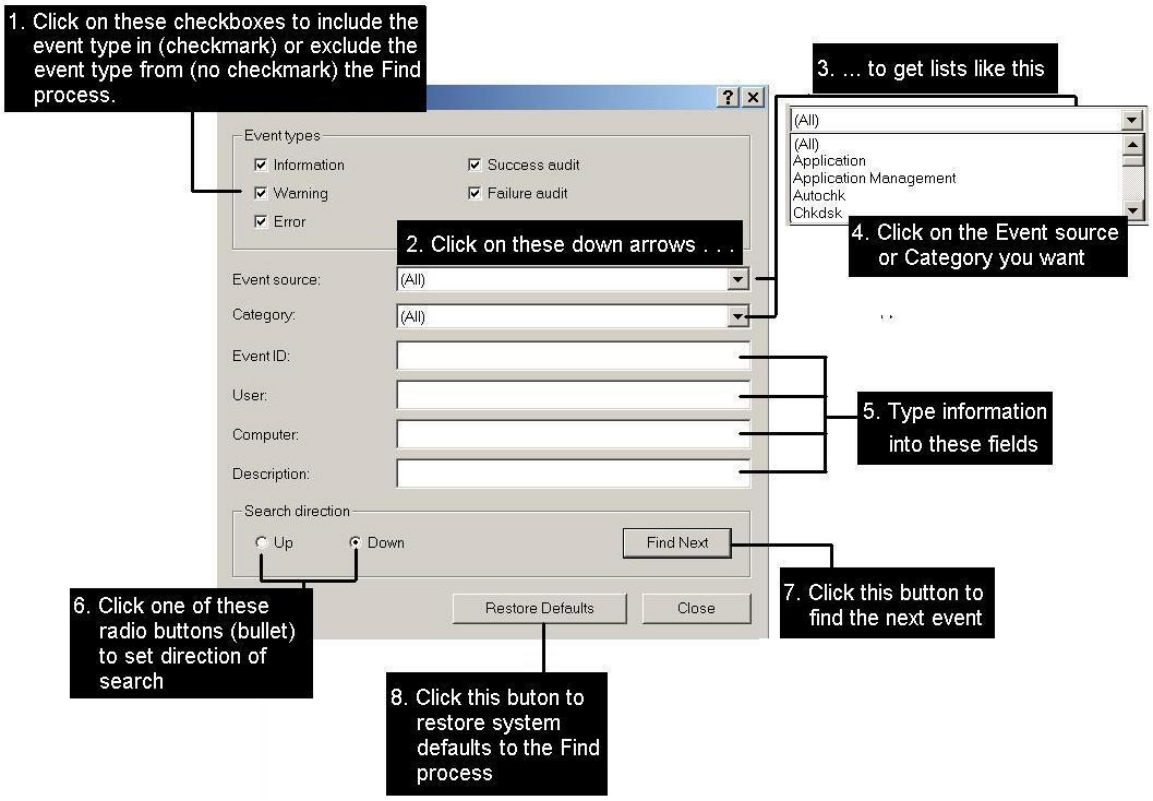
   — To view more details about an event
   — To clear an event log
   — To archive an event log
   — To open an archived event log
   — To free an event log when it is full

   OR



3. Select (click on) the **View** menu.
   A drop-down list of menu items appears.

4. Select (click on) the **Find** menu item.
   A Find in Local Application Log display appears.



5. Select (click on) the checkboxes in the Event Types area of the display:

   —Until a checkmark appears to include the event type in the search

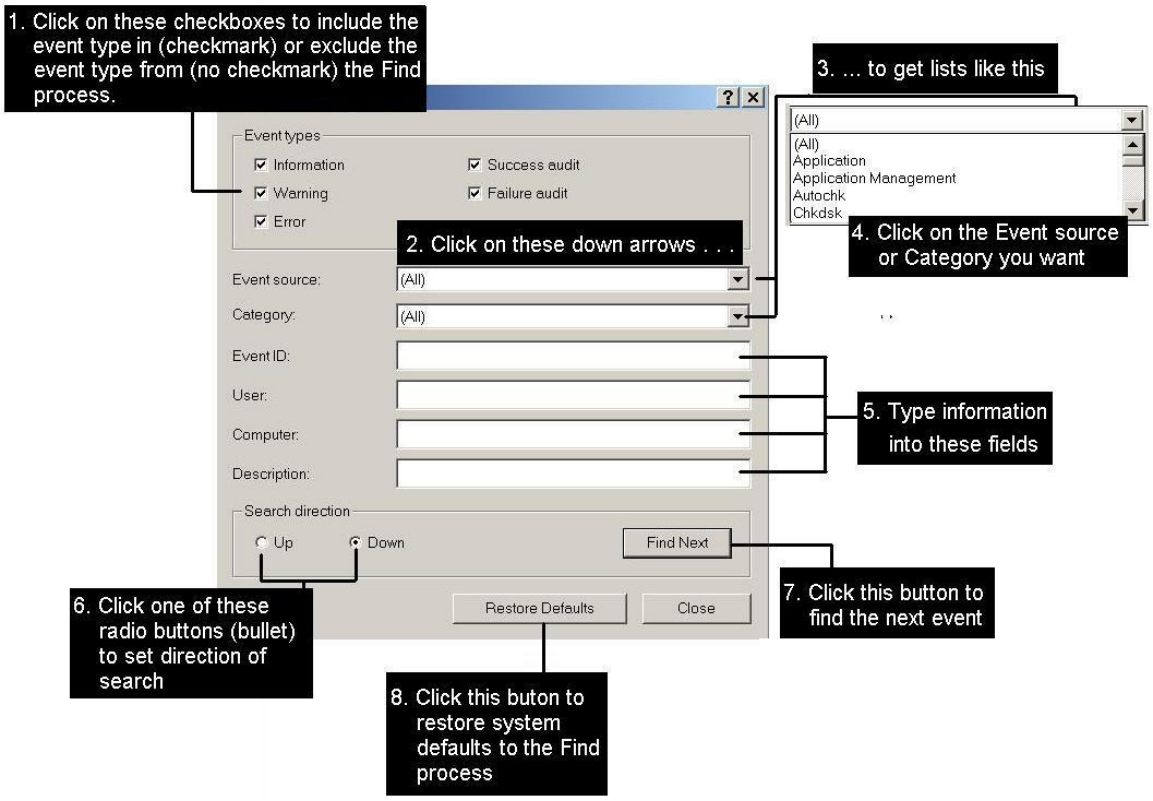
   — Until no checkmark appears to exclude the event type from the search

6. Click on the down arrow in the Event Source field.
   A list of event sources appears.

7. Select (click on) an event source from that list.
   Use the scroll bar to see all of the possible options. The event source you choose appears in the Event Source field.

8. Click on the down arrow in the Category field.
   A list of categories appears.

9. Select (click on) a category from that list.
   Use the scroll bar to see all of the possible options. The category you choose appears in the Event Category field.



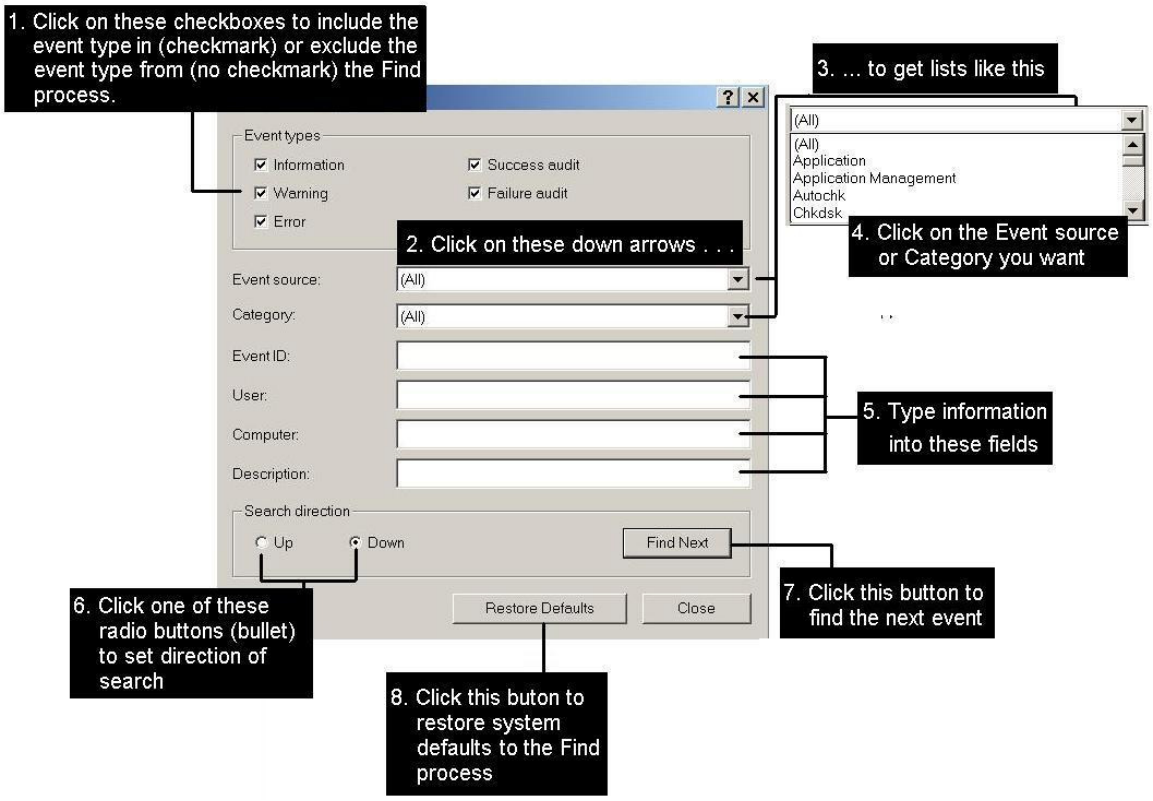
10. Select (click on):

    —the Event ID field.
    —the User field.
    —the Computer field.
    —the Description field.

    This places a text cursor in the field you select.

11. Type the information you want in those fields.

    In the **Description** field, you can type any text that matches a portion of an event record description. For more information about the other fields, right-click the name of the field, and then click **What's This?** (See Note on next page.)



12. Select (click on) on of the radio buttons under Search direction until a bullet appears. This sets the direction of the search.

13. Click on the Find Next command button to start the search.

    The search parameters you set with the Find in Local Application Log display remain throughout the current session. The system restores default settings the next time you start Event Viewer.

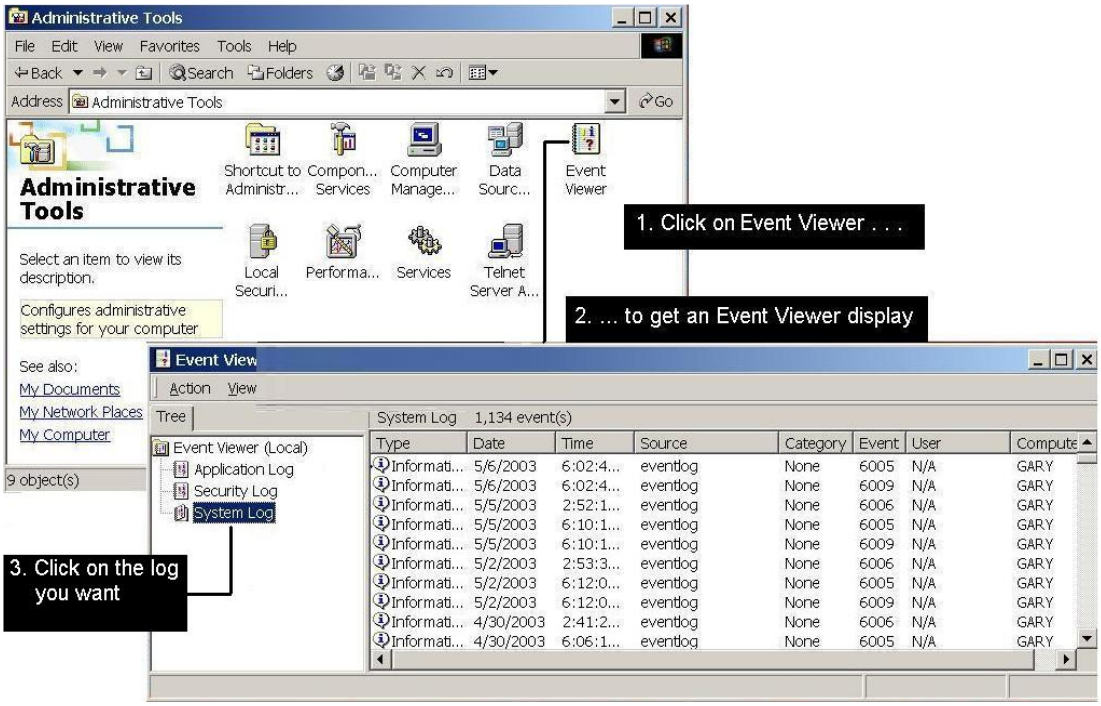
    OR

14. Click on the Restore Defaults command button.

    The search parameters you set with the Find in Local Application Log display remain throughout the current session. The system restores default settings the next time you start Event Viewer.

Note: The Microsoft Corporation has documented both Event Viewer and Find in Local Application Log display. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

To clear an event log


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
My Network Places
My Computer
9 object(s)
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
Services
Telnet Server A...
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
3. Click on the log you want
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
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Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

When a log is full, it stops recording new events. Clearing the log is one way to free the log and start recording new events. To clear an event log:

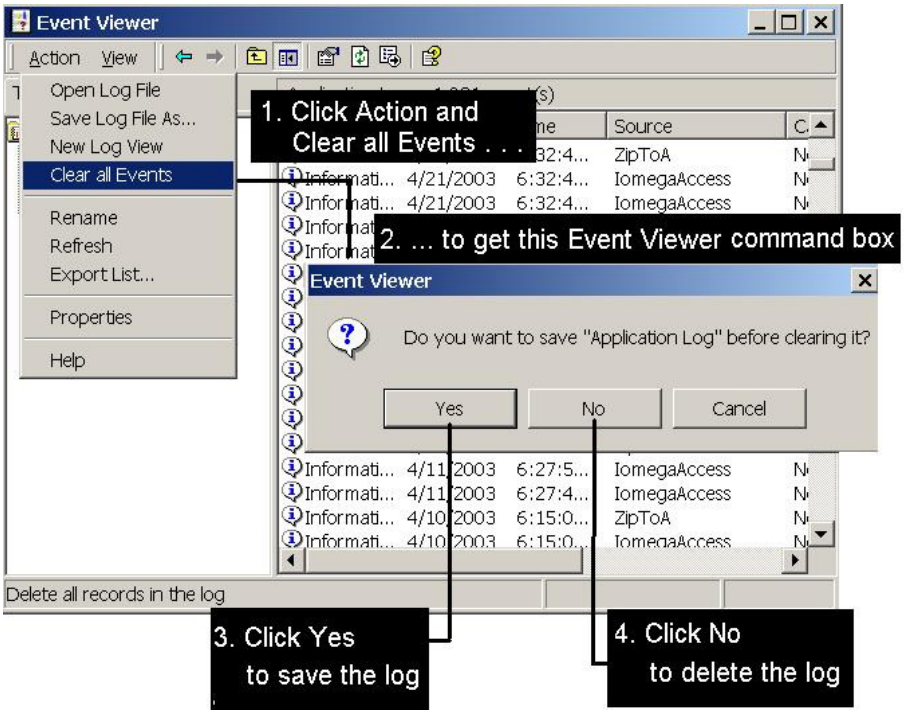
1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To view more details about an event
   — To search for specific types of events
   — To archive an event log
   — To open an archived event log

   OR

3. Click on the log that you want to clear.
   A list of the events in that log appears.



4. Click the Action Menu on the Event Viewer.
   A drop-down list of menu items appears.

5. Select (click on) the Clear all Events menu item.
   An Event Viewer command box appears.

6. Click on the Yes command button.
   This saves the log you have chosen and closes the Event Viewer command box.

   OR

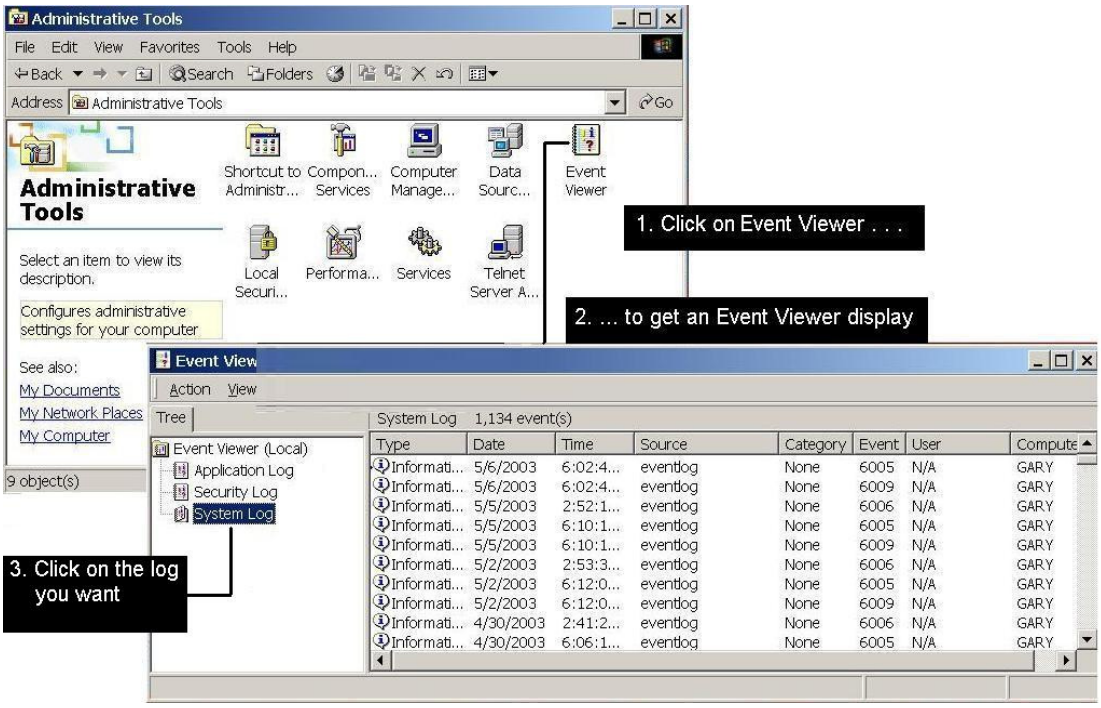
   Click on the No command button.
   This deletes the log you have chosen and closes the Event Viewer command box.

   OR

   Click on the Cancel command button.
   This closes the Event Viewer command box without saving or deleting the log.

Note: After you clear a log, only new events will appear in the log. If you select do not overwrite events (clear log manually) in the Properties dialog box of an active log, you must periodically clear the log either when the log reaches a certain size or when a message notifies you that the log is full.

—*Overwriting events*


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
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Event Viewer
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Performa...
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Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

You can also free log space and start recording new events by overwriting events or increasing the size of a log.

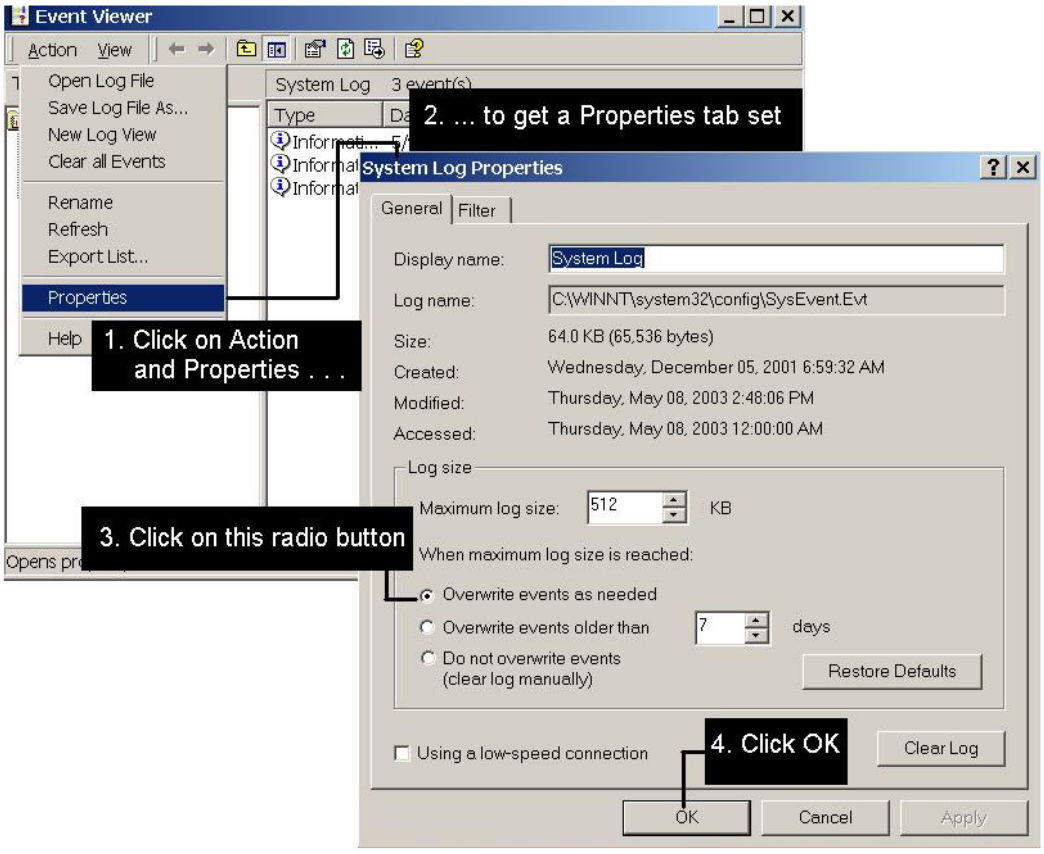
1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To view more details about an event
   — To search for specific types of events
   — To archive an event log
   — To open an archived event log

   OR

3. Click on the log that you want.
   A list of the events in that log appears.



4. Click the Action Menu on the Event Viewer.
   A drop-down list of menu items appears.

5. Select (click on) the Properties menu item.
   A Properties tab set appears.

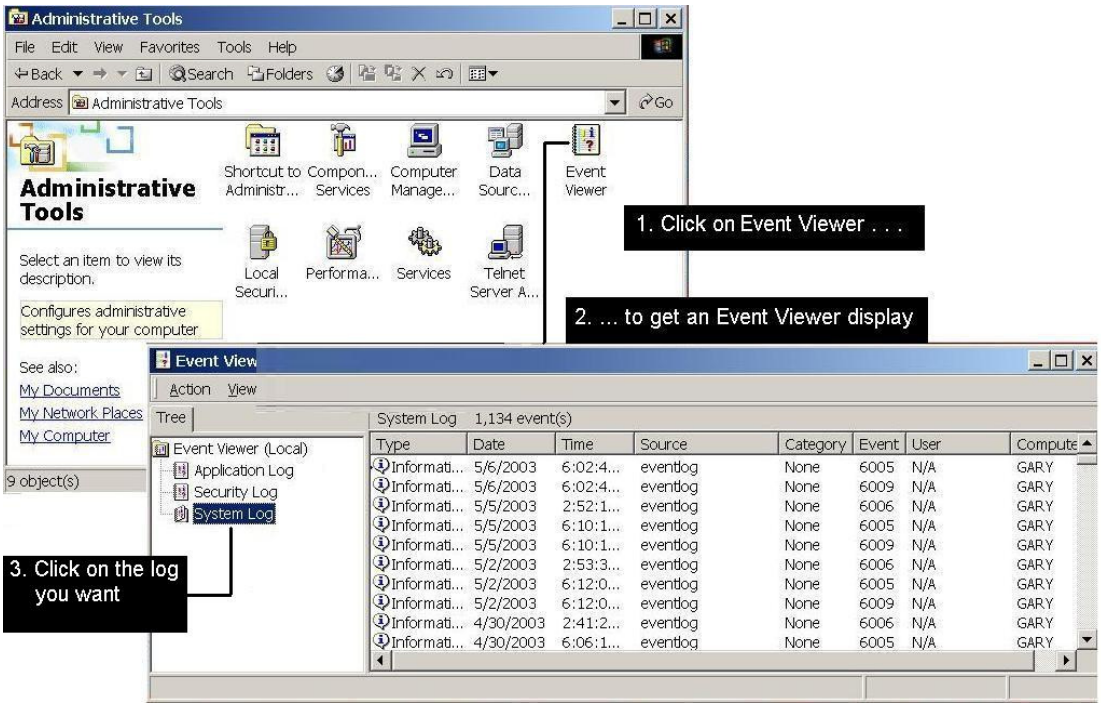
6. Select (click on) the General tab (if necessary).
   This brings that tab to the top of the stack.

7. Click on the radio button next to the Overwrite events as needed item until a bullet appears.

8. Click on the OK command button.
   Windows 2000 writes all new events to the log even when the log is full.

Note: The Microsoft Corporation has documented the Properties tab set and its controls. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

—Increasing the maximum size of a log


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
Services
Telnet Server A...
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
See also:
My Documents
My Network Places
My Computer
9 object(s)
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
3. Click on the log you want
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

You can also start logging new events by increasing the maximum size of a log. To increase the log size:

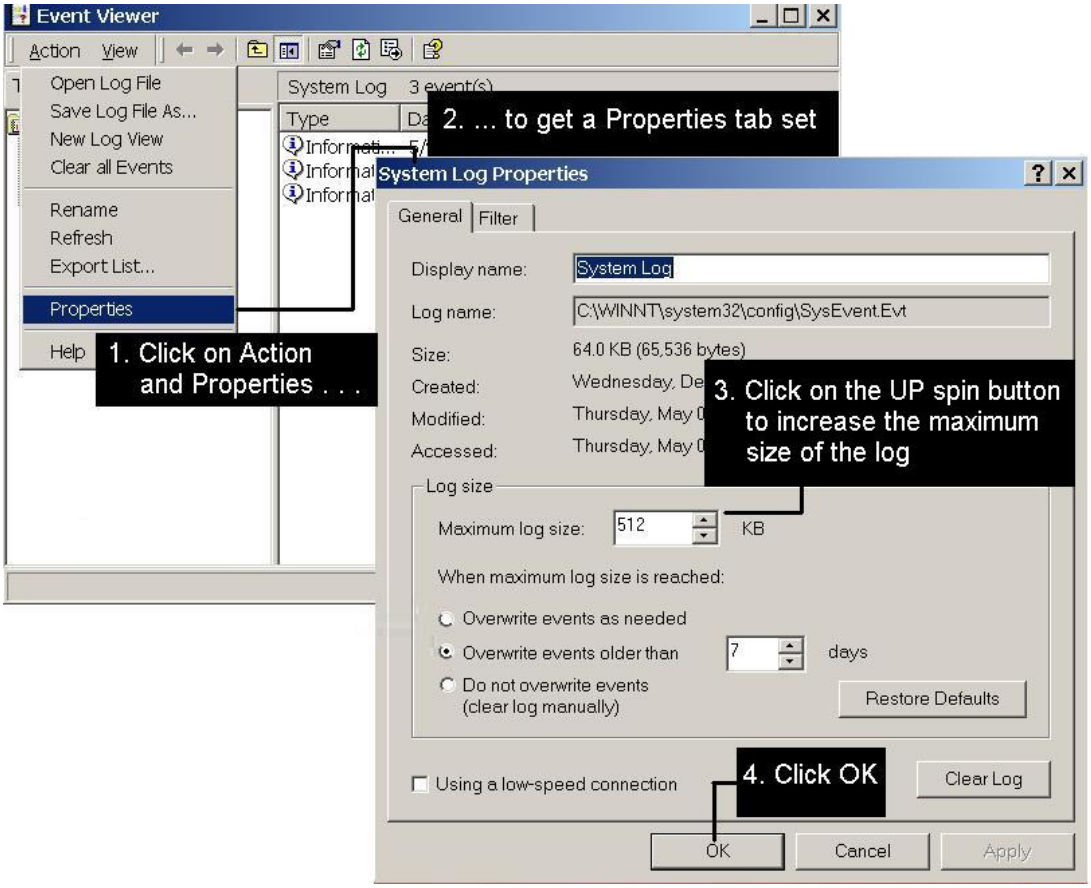
1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To view more details about an event
   — To search for specific types of events
   — To archive an event log
   — To open an archived event log

   OR

3. Click on the log that you want.
   A list of the events in that log appears.



4. Click the Action Menu on the Event Viewer.
   A drop-down list of menu items appears.

5. Select (click on) the Properties menu item.
   A Properties tab set appears.

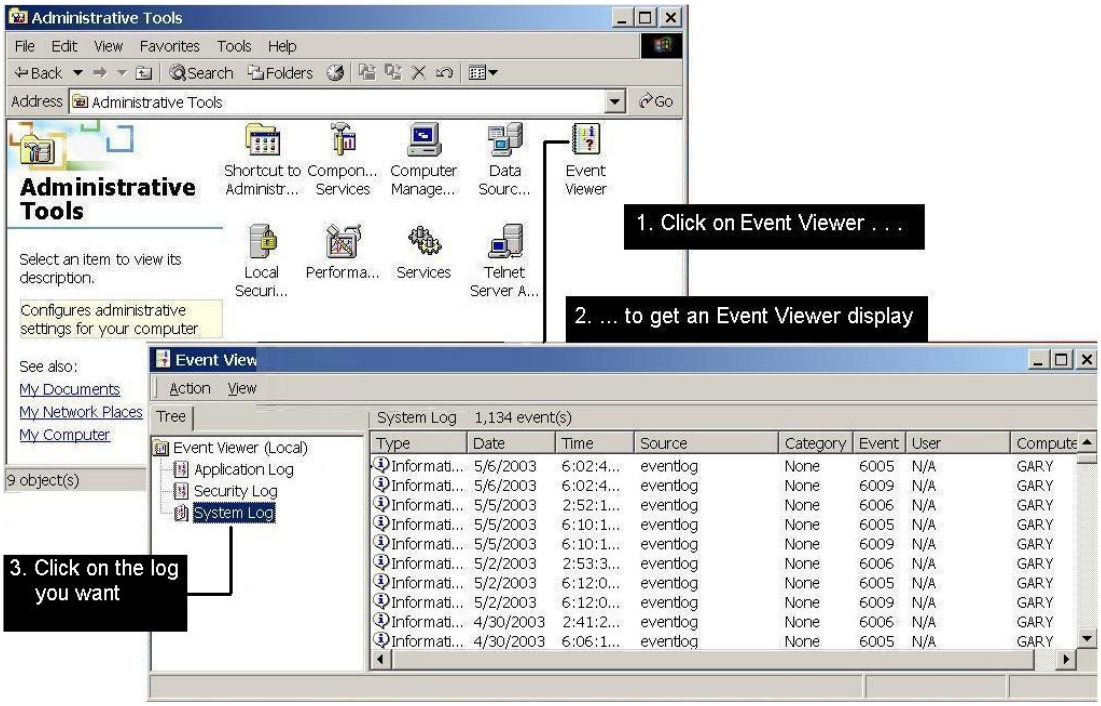
6. Select (click on) the General tab (if necessary).
   This brings that tab to the top of the stack.

7. Click on the upper spin button next to the Maximum log size field to increment the size of the log you have chosen.

8. Click on the OK command button.
   Windows 2000 uses the new log size to determine when the log is full.

Note: The Microsoft Corporation has documented the Properties tab set and its controls. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

To archive an event log


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
My Network Places
My Computer
9 object(s)
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
Services
Telnet Server A...
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
3. Click on the log you want
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

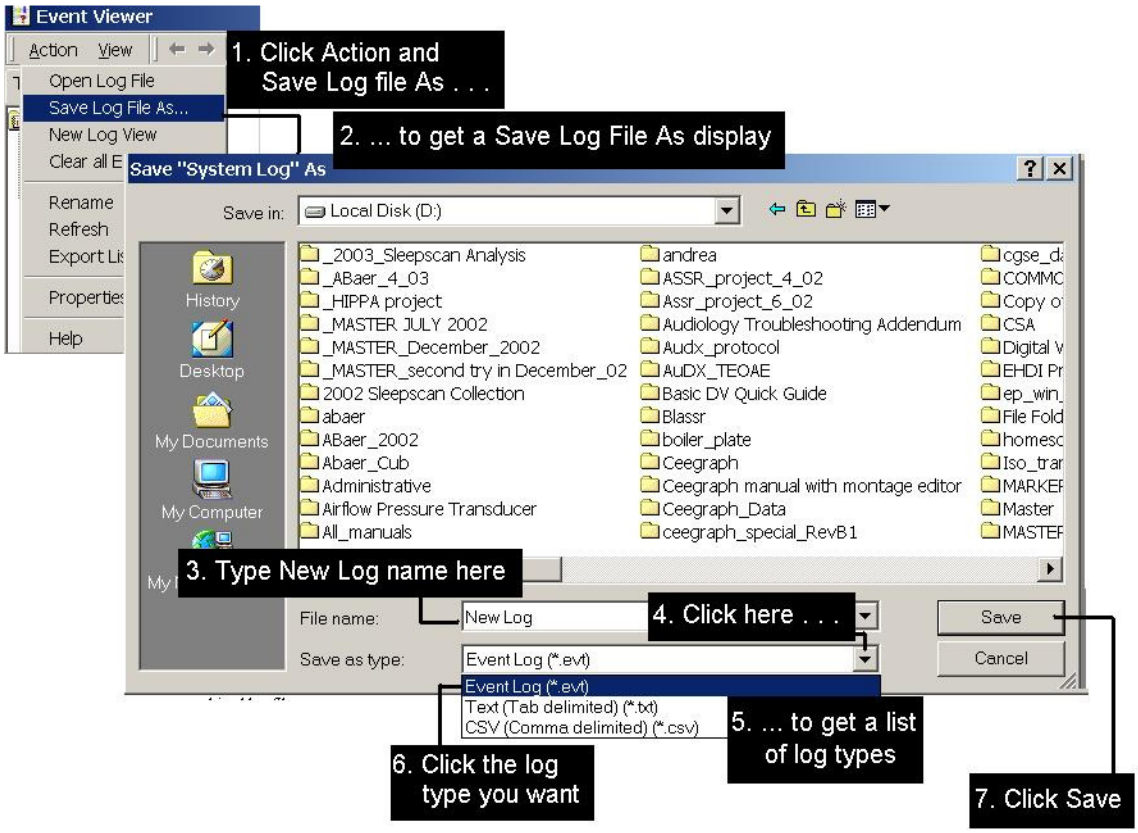
1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To view more details about an event
   — To search for specific types of events
   — To clear an event log
   — To open an archived event log
   — To free an event log when it is full

   OR

3. Click on the log that you want to archive.
   A list of the events in that log appears.



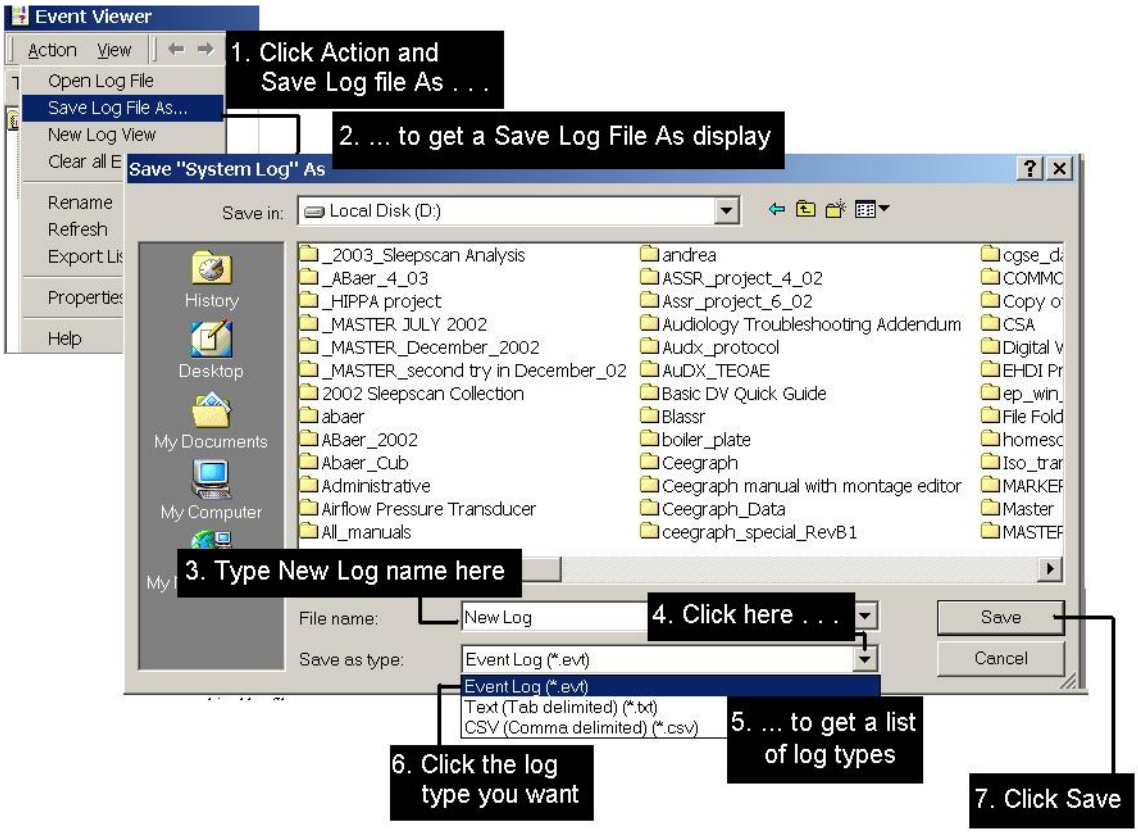
4. Click the Action Menu on the Event Viewer.
   A drop-down list of menu items appears.

5. Select (click on) the Save Log File As menu item.
   A Save Log File As display appears.

6. Use the controls in this display to navigate to a storage area for the log file you want to archive.

   The Microsoft Corporation has documented the Save Log File As display. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

7. Click on the File Name field.
   This places a text cursor in that field.



8. Type the name for the archive file you want to create in that field.
9. Click on the arrow in the Save as type field.
   A drop-down list of options appears.
10. Click on the type of archive file you want to create.

    —If you archive a log in the Event log format (*.evt), you can reopen it in Event Viewer. These log files retain the binary data for each event recorded.

    —If you archive a log in text or comma-delimited format (*.txt and *.csv, respectively), you can reopen the log in other programs such as word processing or spreadsheet programs. Logs saved in text or comma-delimited format do not retain the binary data.

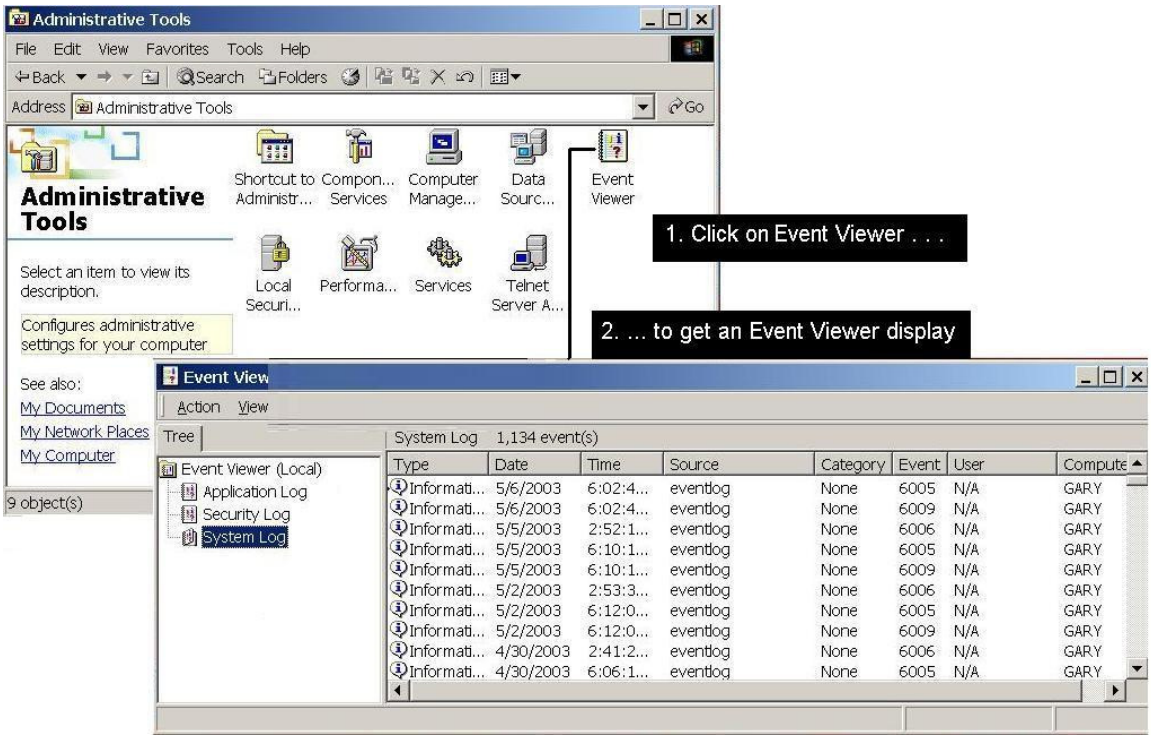
11. Click on the Save command button.
    This archives the log file you have chosen to the location you identified in the file format you specified. It also closes the Save Log As display.

    OR

12. Click on the Cancel command button.
    This closes the Save Log As display without archiving the log.

Note: When you archive a log file, the system saves the entire log, regardless of filtering options. However, the system does not retain the sort order of the events in the log. Archiving has no effect on the current contents of the active log.

To open an archived event log


Administrative Tools
File Edit View Favorites Tools Help
Back Search Folders
Address Administrative Tools
Go
Administrative Tools
Select an item to view its description.
Configures administrative settings for your computer
See also:
My Documents
My Network Places
My Computer
9 object(s)
Shortcut to Administr...
Compon... Services
Computer Manage...
Data Sourc...
Event Viewer
Local Securi...
Performa...
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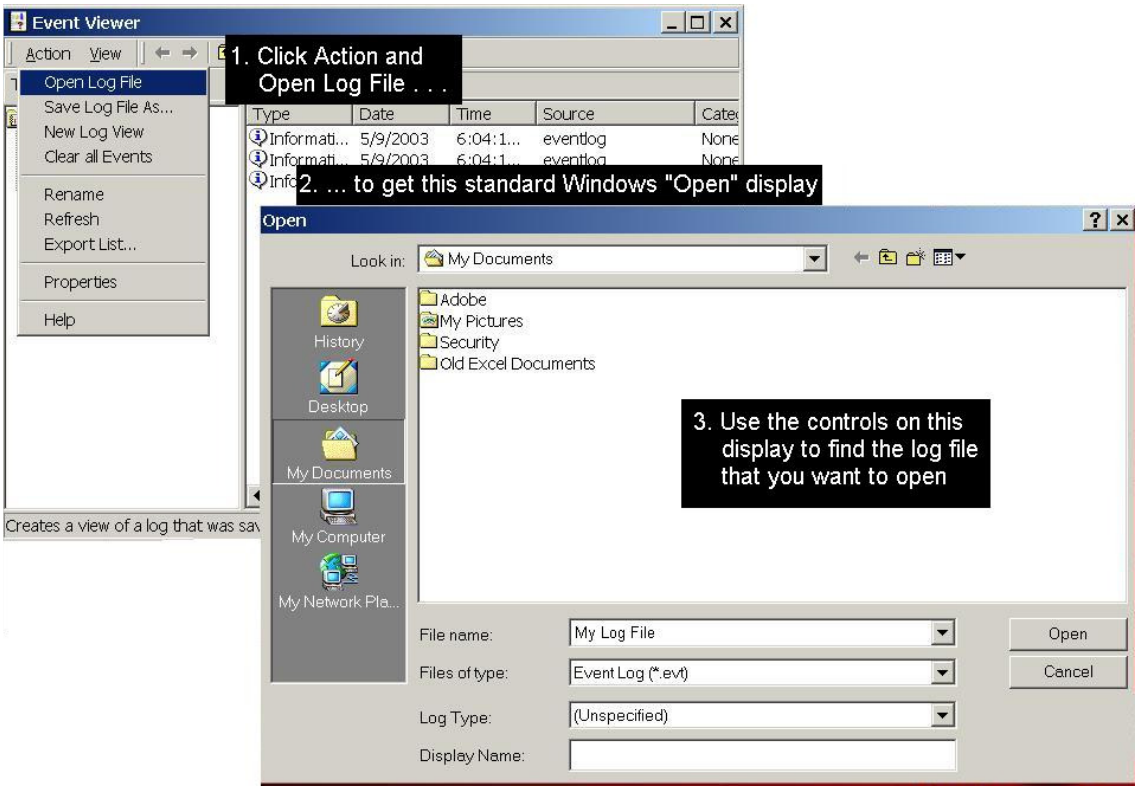
1. Click on Event Viewer . . .
2. ... to get an Event Viewer display
Event View
Action View
Tree
System Log 1,134 event(s)
Event Viewer (Local)
Application Log
Security Log
System Log
Type Date Time Source Category Event User Compute
Informati... 5/6/2003 6:02:4... eventlog None 6005 N/A GARY
Informati... 5/6/2003 6:02:4... eventlog None 6009 N/A GARY
Informati... 5/5/2003 2:52:1... eventlog None 6006 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6005 N/A GARY
Informati... 5/5/2003 6:10:1... eventlog None 6009 N/A GARY
Informati... 5/2/2003 2:53:3... eventlog None 6006 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6005 N/A GARY
Informati... 5/2/2003 6:12:0... eventlog None 6009 N/A GARY
Informati... 4/30/2003 2:41:2... eventlog None 6006 N/A GARY
Informati... 4/30/2003 6:06:1... eventlog None 6005 N/A GARY

1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.

2. Use the menus and icons on the Event Viewer display to operate the Event Viewer feature:

   — To view more details about an event
   — To search for specific types of events
   — To clear an event log
   — To archive an event log
   — To free an event log when it is full

   OR



3. Click the Action Menu on the Event Viewer.
   A drop-down list of menu items appears.

4. Select (click on) the Open Log File menu item.
   A standard, Windows 2000 Open display appears.

5. Use the controls on this display to search for and open the log file that you want.
   You can view an archived file in Event Viewer only if the log is saved in log file format (*.evt). See the To archive an event log section of this document.

Note: The Microsoft Corporation has documented "Open" displays of this type. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

Windows XP: Event Viewer: Overview

Using the event logs in Windows XP Event Viewer, you can gather information about hardware, software, and system problems. You can also monitor Windows XP security events. A computer running any version of Windows XP records events in three kinds of logs:

—**Application logs**: The application log contains events logged by applications or programs. For example, a database program might record a file error in the application log. The developer decides which events to record.

—**Security logs:** The security log records events such as valid and invalid logon attempts. It also records events related to resource use such as creating, opening, or deleting files or other objects. An administrator can specify what events appear in the security log. For example, if you have enabled logon auditing, attempts to log on to the system go into the security log.

Note: By default, security logging is turned off. Use the Group Policy facility to enable security logging. Administrators can also set auditing policies that cause the system to halt when the security log is full

—**System log:** The system log contains events logged by Windows XP system components. For example, the failure of a driver or other system component to load during startup appears in the system log. Windows XP predetermines the event types that the system components log.

A computer running Windows XP as a domain controller records events in two additional logs:

—Directory service log: The directory service log contains events logged by the Windows directory service. For example, connection problems between the server and the global catalog appear in the directory service log.

—File Replication service log: The File Replication service log contains events logged by the Windows File Replication service. For example, file replication failures and events that occur while domain controllers are being updated with information about system changes appear in the file replication log.

A computer running Windows XP as a Domain Name System (DNS) server records events in an additional log:

—DNS server log: The DNS server log contains events logged by the Windows DNS service. Events associated with resolving DNS names to Internet Protocol (IP) addresses appear in this log.

Events

Event Viewer displays these types of events:

Error—A significant problem such as loss of data or loss of functionality. For example, if a service fails to load during startup, Windows XP logs an Error event.

Warning—An event that is not necessarily significant, but may indicate a possible future problem. For example, when disk space is low, Windows XP logs a Warning event.

Information—An event that describes the successful operation of an application, driver, or service. For example, when a network driver loads successfully, Windows XP logs an Information event.

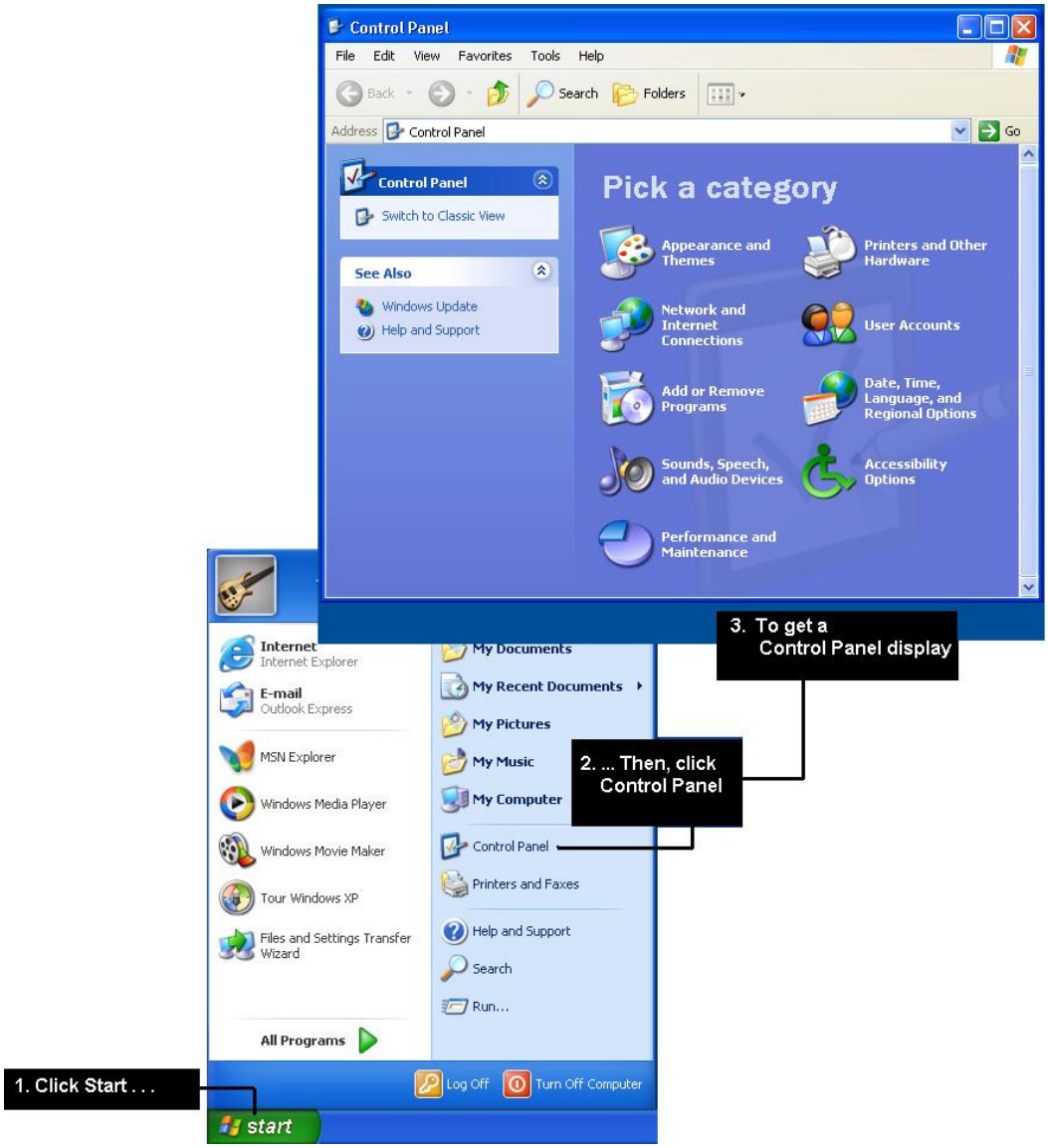
Success Audit—An audited security access attempt that succeeds. For example, a user's successful attempt to log on to the system logs as a Success Audit event.

Failure Audit—An audited security access attempt that fails. For example, if a user tries to access a network drive and fails, the attempt logs as a Failure Audit event.

The Event Log service starts automatically when you start Windows XP. All users can view application and system logs. Only administrators can gain access to security logs.

.

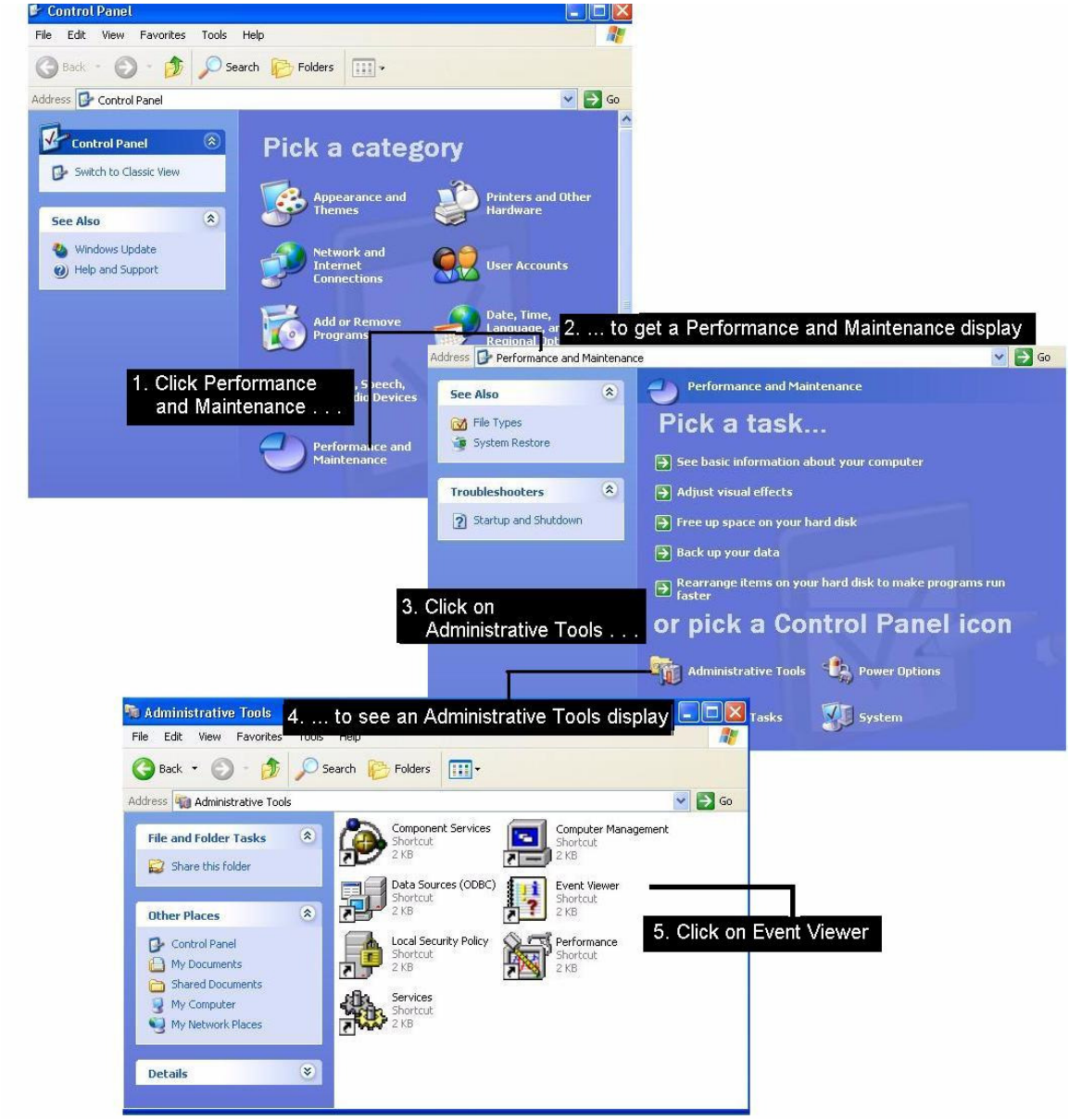
Using Event Viewer



Event Viewer maintains logs about program, security, and system events on your computer. You can use Event Viewer to view and manage the event logs, gather information about hardware and software problems, and monitor Windows security events.

To open Event Viewer:

1. Go to the Start screen for your computer.
2. Click on the Start button.
   A display with a list of options appears.
3. Click on the Control Panel option.
   A Control Panel display appears.

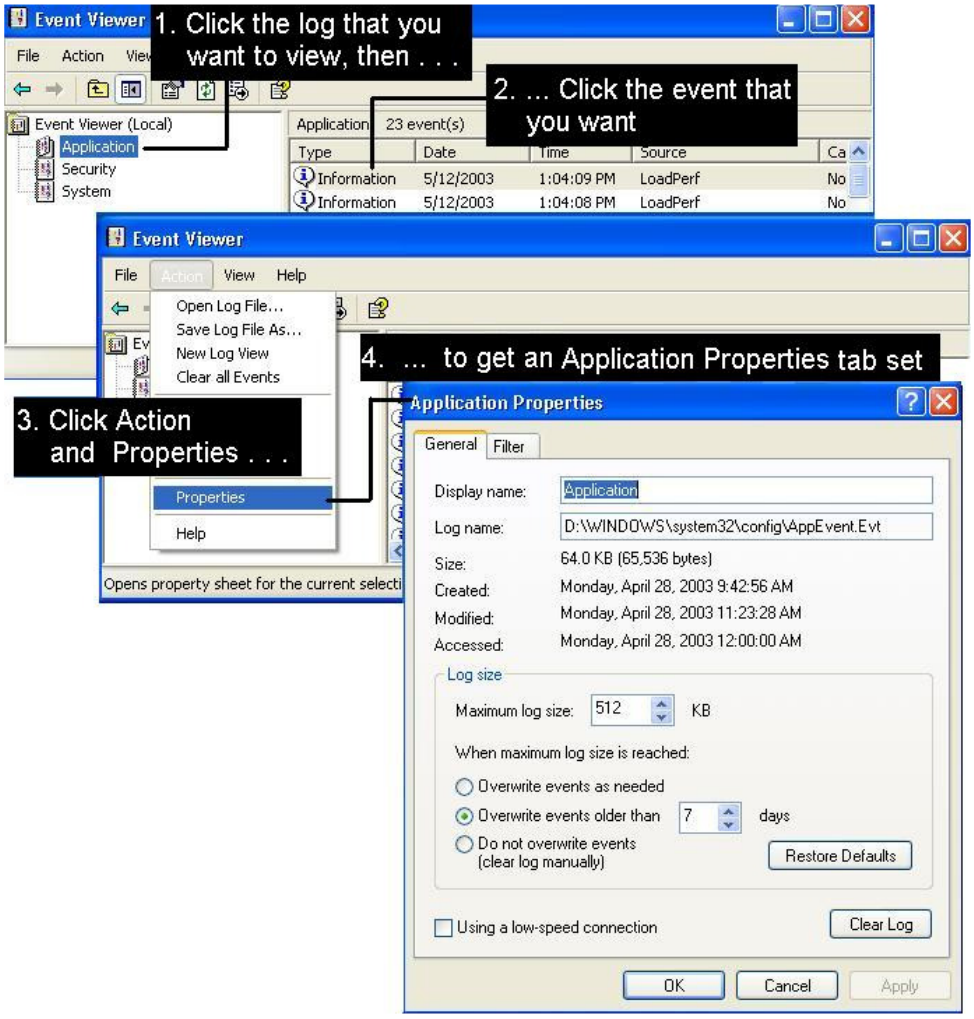


4. Click on the Performance and Maintenance icon.
   This launches a Performance and Maintenance display.

5. Click on the Administrative Tools icon.
   This launches an Administrative Tools display

6. Click on the Event Viewer icon.
   This launches the Event Viewer display.

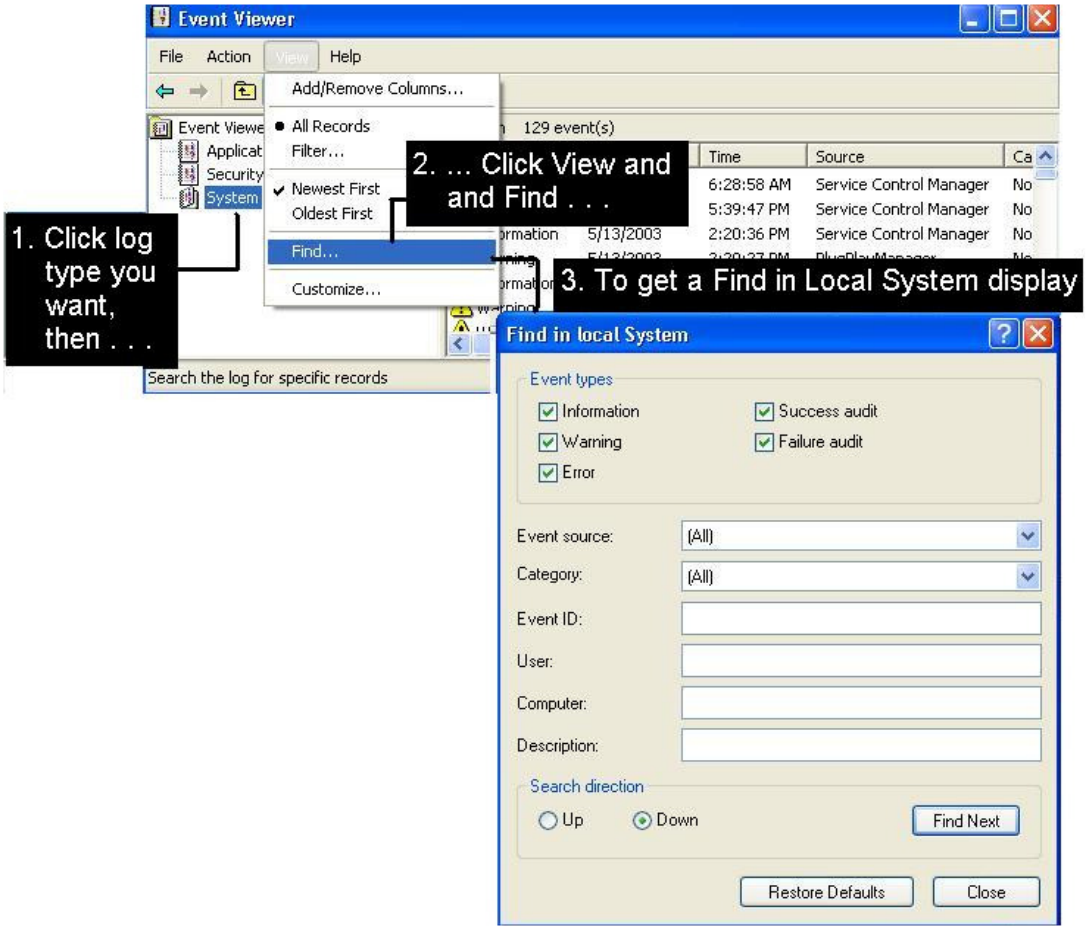
To view more details about an event


1. Click the log that you want to view, then . . .
2. . . . Click the event that you want
3. Click Action and Properties . . .
4. . . . to get an Application Properties tab set
Event Viewer
File Action View
Event Viewer (Local)
Application
Security
System
Application 23 event(s)
Type Date Time Source
Information 5/12/2003 1:04:09 PM LoadPerf
Information 5/12/2003 1:04:08 PM LoadPerf
File Action View Help
Open Log File...
Save Log File As...
New Log View
Clear all Events
Properties
Help
Opens property sheet for the current selecti
Application Properties
General Filter
Display name: Application
Log name: D:\WINDOWS\system32\config\AppEvent.Evt
Size: 64.0 KB (65,536 bytes)
Created: Monday, April 28, 2003 9:42:56 AM
Modified: Monday, April 28, 2003 11:23:28 AM
Accessed: Monday, April 28, 2003 12:00:00 AM
Log size
Maximum log size: 512 KB
When maximum log size is reached:
Overwrite events as needed
Overwrite events older than 7 days
Do not overwrite events (clear log manually)
Restore Defaults
Using a low-speed connection
Clear Log
OK Cancel Apply

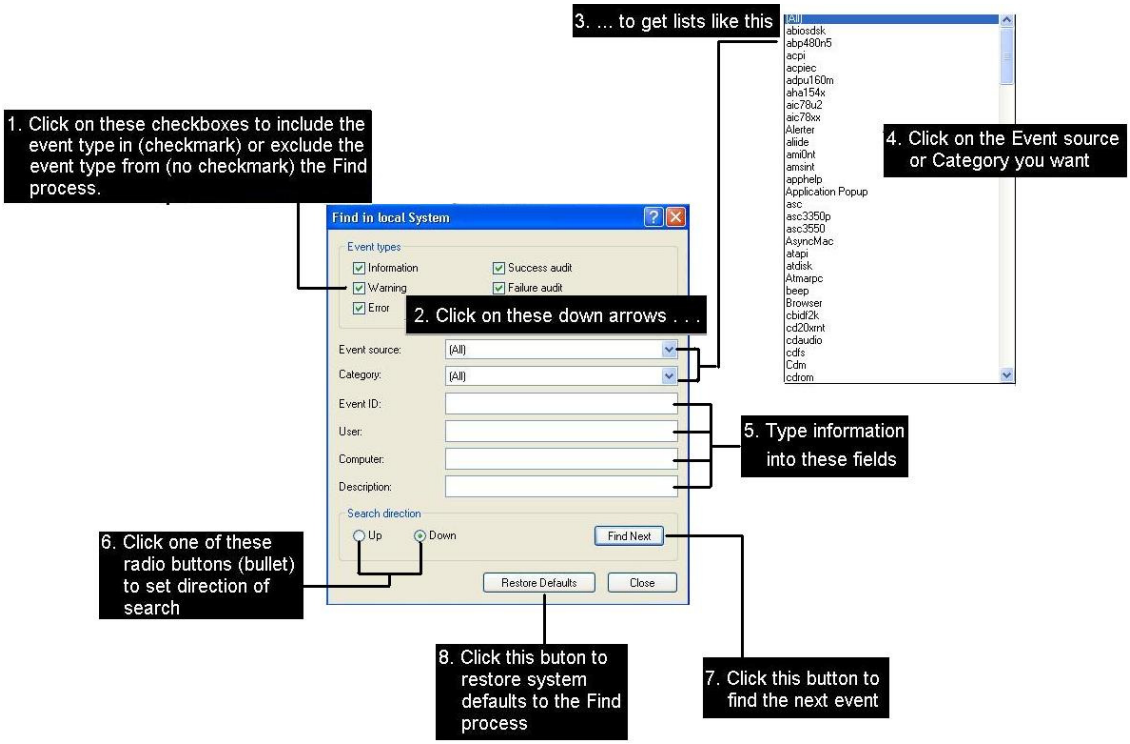
1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.
2. Select (click on) the type of log that you want to open.
   A list of events for that log appears.
3. Select (click on) the event you want from that list.
4. Select (click on) the Action menu.
   A drop-down list of menu items appears.
5. Select (click on) the Properties menu item.
   This launches a set of Application Properties tabs for the event you have chosen.
6. Click on each tab to view details fro the event.

Note: The Microsoft Corporation has documented the Application Properties tab set. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

To search for specific events



1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.
2. Select (click on) the log that you want to search.
   A list of events for that log appears.
3. Select (click on) the View menu.
   A drop-down list of menu items appears.
4. Select (click on) the Find menu item.
   A Find in Local System display appears.


3. ... to get lists like this
1. Click on these checkboxes to include the event type in (checkmark) or exclude the event type from (no checkmark) the Find process.
4. Click on the Event source or Category you want
Find in local System
Event types
Information
Success audit
Warning
Failure audit
Error
2. Click on these down arrows . . .
Event source:
Category:
Event ID:
User:
Computer:
Description:
Search direction
Up
Down
Find Next
Restore Defaults
Close
5. Type information into these fields
6. Click one of these radio buttons (bullet) to set direction of search
8. Click this buton to restore system defaults to the Find process
7. Click this button to find the next event

5. Select (click on) the checkboxes in the Event Types area of the display:

   —Until a checkmark appears to include the event type in the search

   — Until no checkmark appears to exclude the event type from the search

6. Click on the down arrow in the Event Source field.
   A list of event sources appears.

7. Select (click on) an event source from that list.
   Use the scroll bar to see all of the possible options. The event source you choose appears in the Event Source field.

8. Click on the down arrow in the Category field.
   A list of categories appears.

9. Select (click on) a category from that list.
   Use the scroll bar to see all of the possible options. The category you choose appears in the Event Category field.

10. Select (click on):

    —the Event ID field.
    —the User field.
    —the Computer field.
    —the Description field.

    This places a text cursor in the field you select.

11. Type the information you want in those fields.

    In the **Description** field, you can type any text that matches a portion of an event record description. For more information about the other fields, right-click the name of the field, and then click **What's This?**

12. Select (click on) on of the radio buttons under Search direction until a bullet appears.
    This sets the direction of the search.

13. Click on the Find Next command button to start the search.

    The search parameters you set with the Find in Local System display remain throughout the current session. The system restores default settings the next time you start Event Viewer. See **Note**.

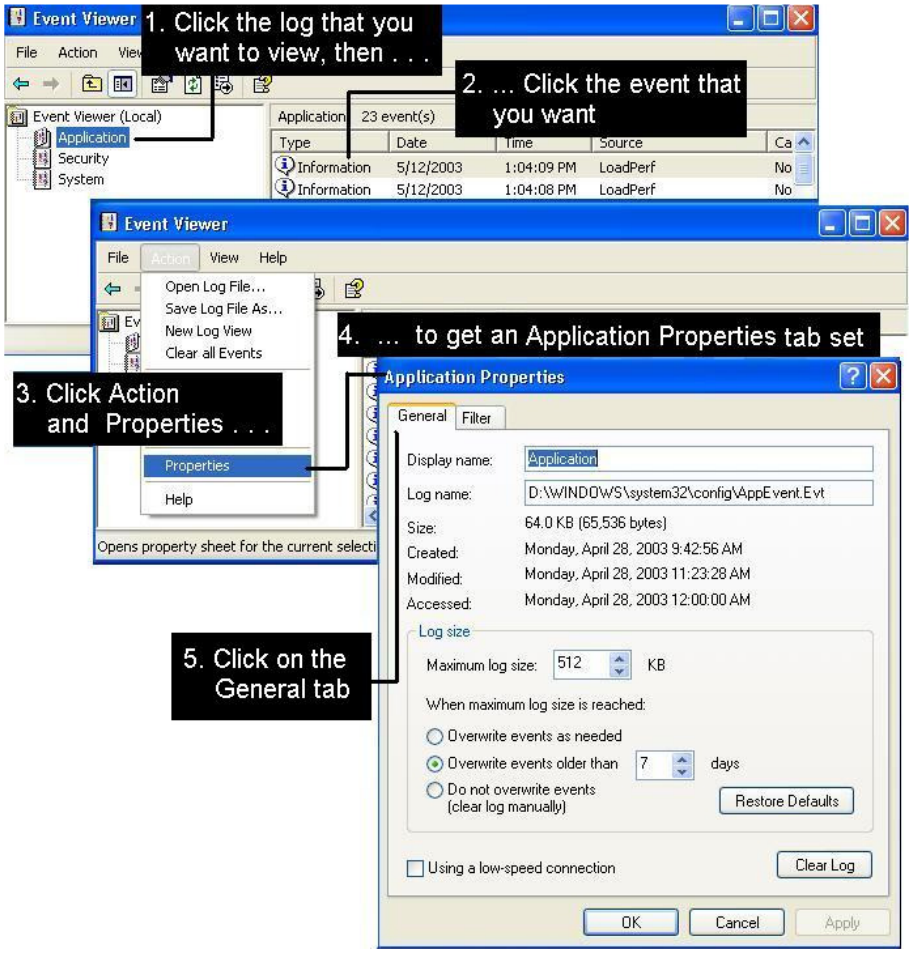
    OR

14. Click on the Restore Defaults command button.

    The search parameters you set with the Find in Local System display remain throughout the current session. The system restores default settings the next time you start Event Viewer.

Note: The Microsoft Corporation has documented both Event Viewer and Find in Local Application Log display. Please consult Microsoft's documentation for more information. Microsoft documentation usually comes with and resides on the same CD as the Windows 2000 operating system. You may also try clicking the Help icon ( ) on Event Viewer or making contact with Microsoft Corporation's technical support at www.microsoft.com.

To change the event log size


1. Click the log that you want to view, then . . .
2. . . . Click the event that you want
3. Click Action and Properties . . .
4. . . . to get an Application Properties tab set
5. Click on the General tab
Event Viewer
File Action View
Event Viewer (Local)
Application
Security
System
Application 23 event(s)
Type Date Time Source
Information 5/12/2003 1:04:09 PM LoadPerf
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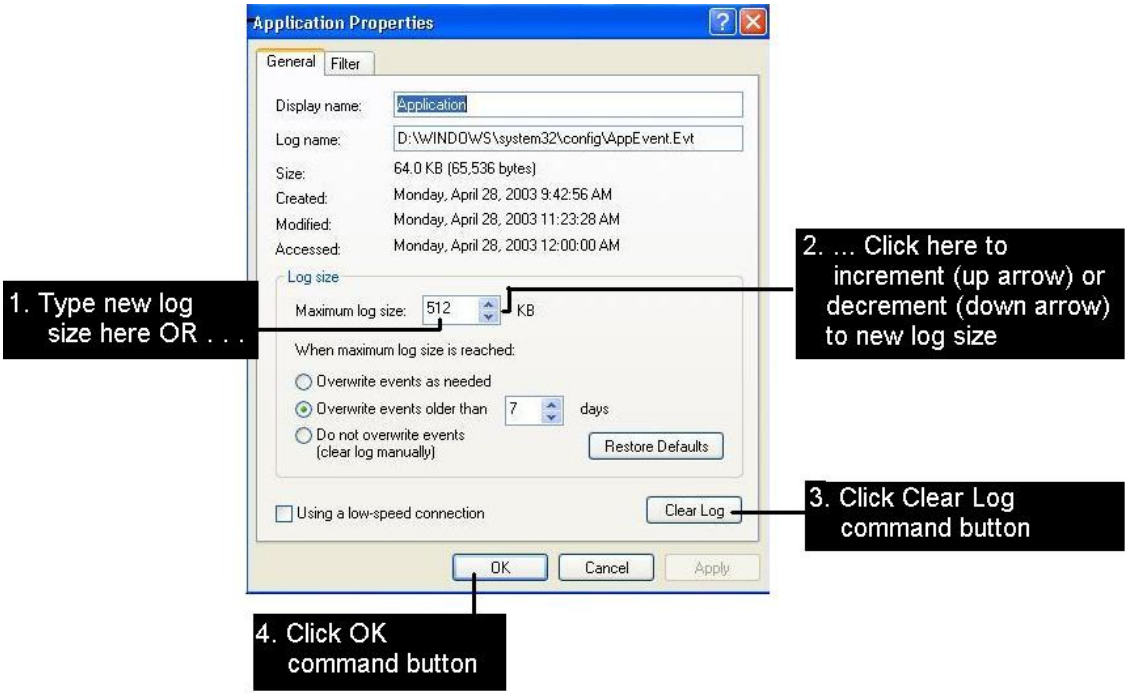
Open Log File...
Save Log File As...
New Log View
Clear all Events
Properties
Help
Opens property sheet for the current selecti
Application Properties
General Filter
Display name: Application
Log name: D:\WINDOWS\system32\config\AppEvent.Evt
Size: 64.0 KB (65,536 bytes)
Created: Monday, April 28, 2003 9:42:56 AM
Modified: Monday, April 28, 2003 11:23:28 AM
Accessed: Monday, April 28, 2003 12:00:00 AM
Log size
Maximum log size: 512 KB
When maximum log size is reached:
Overwrite events as needed
Overwrite events older than 7 days
Do not overwrite events (clear log manually)
Restore Defaults
Using a low-speed connection
Clear Log
OK Cancel Apply

1. Follow the steps in the Using Event Viewer section of this document to open Event Viewer.
2. Select (click on) the log that you want to search.
   A list of events for that log appears.
7. Select (click on) the Action menu.
   A drop-down list of menu items appears.
3. Select (click on) the Properties menu item.
   This launches a set of Application Properties tabs for the event you have chosen.
4. Select (click on) the General tab.
   This brings that tab to the top of the stack.



5. Click on the Maximum log size field.
   This places a text cursor in the field.
6. Type in the maximum log size you want.

   OR

7. Click on the spin arrows next to the Maximum log size field.
8. Use the spin arrows to increment (up arrow) or decrement (down arrow) the value in the field to the log size you want.
9. Click the Clear Log command button.
   A message appears that asks you want to save the original log before clearing it.
10. Click Yes.
    This clears the message, retains the information currently in the log, and puts the new size setting into effect.
11. Click the OK command button.
    This closes the tab set and implements any change you have made.

Notes

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CALIBRATION

Introduction

There are two different methods of performing “Calibration” on a digital system. The primary method is the Internal Amplifier Calibration that is performed automatically by the system upon entering the Ceegraph / Sleepscan Collection programs. On the newer amplifier hardware, once this internal calibration has been performed, the results are stored in the head box and maintained until the headbox power has been cycled. Therefore, when the Ceegraph / Sleepscan program is first entered after a headbox power up, there is a longer delay of the message “Please wait Calibrating Amplifiers”, before the message “Calibration Complete” is displayed. After this initial calibration has been performed and the results have been saved in the headbox any additional entering of the Ceegraph / Sleepscan collection program the saved results are transmitted to the program and the message “Calibration Complete” is displayed after a much shorter delay.

The secondary method is a Display Calibration or a Visual Cal, that resembles the more traditional calibration of and Analog / Paper system, with the exception that there are no “adjustments” to be performed.

Internal Amplifier Calibration

There are two calibration measurements that are performed during the Internal Amplifier Calibration. The first measurement is for Gain Error. This measurement is required in order to adjust for the variances in the component value tolerances used in the construction of the amplifiers. The operational amplifiers, resistors, capacitors, etc. used in the design are precision components with a typical tolerance of +/- 1%. However, the combination of multiple component tolerances can add up to variances in over all gain of typically 5% to a maximum of 7%. Any amplifier channel with a Gain Error greater that 7% will be reported has having failed calibration. The Gain Error Calibration results are saved in the acquired data files in order to adjust each channel when acquired signal amplitudes are measured.

The Gain Error measurements are performed as follows. First the amplifier inputs are switched from the electrode jack inputs to an internal precision calibration signal source. This signal is a 100 uVp-p sine wave at 16 Hz and is applied to each of the amplifier channels. A resultant output signal epoch is sampled and analyzed to determine peak to peak signal amplitude and determine the difference of the signal from the expected 100 uV. (i.e. typically 95 uV to 105 uV).

The second calibration measurement that is performed during the Internal Amplifier Calibration is DC Offset. This measurement is required in order to adjust the variances in DC offset drift in each of the amplifiers channels. Again value tolerances and leakage currents in the components used in the design of the amplifiers will cause the 0-Volt baseline of each channel to drift to a more "natural" idle baseline, typically something other than 0 volts. DC offsets in each channel of up to 500 mV can be adjusted for in the program without any visual drifting of the channel baseline. Any amplifier channel with a DC Offset greater that 500 mV will be reported has having failed calibration. The DC Offset Calibration results are added or subtracted to each channel after the signal has been acquired in order to adjusts its baseline.

The DC Offset measurements are performed as follows. First the amplifier inputs are switched from the electrode jack inputs to an internal precision calibration signal source. This signal is set to ground or 0 volts and is applied to each of the amplifier channels. After a delay to allow the channels to settle the resultant output signal epoch is sampled and analyzed to by averaging every sampled point to determine the overall DC value of the signal. This DC value is the offset that is used to adjust each channel.

Display Calibration

The other method of performing a calibration is to record a Calibration Signal in the Study that resembles the more traditional calibration of an Analog / Paper system. This type of calibration will give a visual reference in the recording of a known signal. To record the Visual Cal signal into a study, first a "Digital" or "System Ref" Referential Montage must be selected. In other words, each channel input to System Reference. Then the "CAL" button is pressed to insert the calibration signal as saved in the Setup -> Calibration menu. This signal is typically a 100 uV or 10 uV square wave signal from 0.5 Hz to 2 Hz. The decay slope of the integrated square wave will vary depending on the value of the Low Filter (High Pass).

Pulse Oximeter Calibration

The Internal Pulse Oximeter in the Netlink or Netlink ICU Headbox provides a calibrated digital value readout. Natus Medical Incorporated calibrates these units in the factory upon construction. They require no additional calibration.

Troubleshooting

All Bio-logic hardware and software is tested at the factory before being shipped. Additionally, the system has built in testing capabilities to help isolate any problems that you may encounter.

Your Bio-logic System performs a series of self tests whenever you turn it on. Should the computer fail any of the tests it beeps and tries to display an error message. Additionally, disk-based diagnostics are available to test different computer boards such as the CPU, Memory, and I/O boards.

Following simple precautions and maintenance procedures minimizes system crashes and malfunctions. System crashes are most commonly caused by power pollutants and equipment malfunctions.

Power pollutants

If the power pollutants in the paragraphs below (or any other power pollutants) are in the environment where you are using the Sleepscan or Ceegraph systems, Natus Medical Incorporated strongly recommends that you use an approved power conditioner and uniterruptible power supply (UPS) with the system.

Blackouts and brownouts

A blackout is a complete loss of power that usually lasts fewer than ten seconds. A brownout is a reduction in voltage. During a brownout, computer equipment is more susceptible to the effects of other power pollutants. The only safeguard against blackouts and brownouts is an uninterruptible power supply (UPS).

Voltage transients

Voltage transients are spikes and dips above or below normal levels. These spikes and dips are generally caused by turning on and off other electrical equipment. Voltage spikes are the more damaging. A spike of several thousand volts (which may occur during a lightning storm) can cause severe damage to semiconductor-based equipment. Simple, inexpensive voltage suppressors can protect your Bio-logic system against voltage transients.

Electrical noise

Electrical noise usually comes from electromagnetic and radio-frequency interference. The most common source of this power pollutant is digital electronic equipment. Power line filters can control electrical noise problems.

Equipment malfunctions

System Read/Write errors or Bad Sector errors stem from a worn or damaged disk, a misaligned disk drive, or a head crash on a hard disk. To avoid these types of errors, replace used floppy disks periodically and keep disk drives clean and aligned.

To reach Natus Medical Incorporated Customer Support, use this phone number: (800) 323-8326. When you call for support, please have the equipment in question readily available, if posible. Please have the following information:

- The Serial Number of your system and additional account information.
- The Part Number and Serial Number of the defective part.

- A detailed descriptions of the steps you took to arrive at the problem.
- The name, model number, and software version you are using on your system.
- The system configuration (including any peripherals being used).
- Any additional information that helps describe your system and the difficulty you are experiencing.
- The name and phone number of your company's contact person.
- A purchase order number.

Troubleshooting Table

GENERAL CONDITION	SYMPTOM	SOLUTION
Power up failures	Power indicator light on computer is OFF	Check that computer power switch is ON. Check power at wall outlet and/or transformer. Check computer power cord at both ends. Check internal cable attaching power-on light. Check line select switch appropriate for area.
	Power indicator light on computer is ON.	Check graphics board. Check that all boards in the computer are seated properly.
CRT problems	Power indicator light on monitor is OFF	Check that monitor power switch is ON. Check monitor power cord at both ends. Check power at wall outlet and/or transformer. Check line select switch.
	Power indicator light on monitor is ON	Check monitor-to-computer cable at both ends. Check monitor settings (brightness, contrast, etc.). Check graphics board. Make sure all boards are seated properly. Check computer CPU.
	Abnormal screen display	Check monitor-to-computer cable at both ends. Check monitor settings (that is brightness, contrast, and others). Check graphics board. Make sure all boards are seated properly. Check computer CPU.
Error messages when booting	Hard drive failure when booting from drive C	Check hard drive controller and cables. Check that boards in computer are seated properly.
	Error reading/writing to hard drive when booting from drive C	Run CHKDSK C: /F to try to correct.

GENERAL CONDITION	SYMPTOM	SOLUTION
Error messages when booting (continued)	Invalid configuration/setup	Check setup.
	Keyboard failure	Check connection to computer.
	Memory parity error	Check setup. Check that boards in computer are seated properly.
Collection problems	Impedance problems	Check electrodes; may need to reapply. Check electrode leads to preamp box or EEG machine. Check that boards in computer are seated properly. Check preamplifier and cable. (Internal amplifier systems only) Run Netlink Diagnostics
	Artifact problems	Check impedances. Check electrodes. Check patient positioning. Check that boards in computer are seated properly. Run Netlink Diagnostics
Printer problems	Printer not responding	Consult the Printer's User manual for diagnostics and troubleshooting.

To find Customer Support

Bio-Logic is committed to customer satisfaction. If the troubleshooting information in this document, the information in your Users and Service Manual, or the information in your On-Line Help programs does not solve your problem:

1. Call Bio-logic's toll free number at 1-800-303-0306.

2. Follow the prompts to reach Customer Support.

Notes

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CONNECTOR PIN ASSIGNMENTS

Netlink and Netlink ICU connector pin assignments

The Netlink and Netlink ICU module uses a 50-pin SCSI connector that you can use to connect to the Quick Tilt unit, the Quick Disconnect unit, the Electro-Cap, or to other auxiliary devices. The assignments for each connector (pinouts) appear in the table below.

Netlink and Netlink ICU connector pinouts

PIN	NAME	FUNCTION	PIN	NAME	FUNCTION
1	CH 1	Analog In	26	=6V	Pull Up
2	CH 2	Analog In	27	CH 22	Analog In
3	CH 4	Analog In	28	CH 23	Analog In
4	CH 6	Analog In	29	CH 24	Analog In
5	CH 9	Analog In	30	N. C.	Open
6	CH 11	Analog In	31	CH 25	Analog In
7	CH 14	Analog In	32	N. C.	Open
8	CH 16	Analog In	33	CH 26	Analog In
9	CH 18	Analog In	34	N. C.	Open
10	CH 19	Analog In	35	CH 27	Analog In
11	CH 3	Analog In	36	N. C.	Open
12	CH 7	Analog In	37	CH 28	Analog In
13	CH 8	Analog In	38	N. C.	Open
14	CH 12	Analog In	39	CH 29	Analog In
15	CH 13	Analog In	40	N. C.	Open
16	CH 17	Analog In	41	CH 30	Analog In
17	COM JK1	Common	42	COM JK2	Common
18	CH 10	Analog In	43	CH 31	Analog In
19	CH 5	Analog In	44	REF JK2	Reference
20	CH 15	Analog In	45	CH 32	Analog In
21	N. C.	Open	46	REF JK2	Reference
22	CH 20	Analog In	47	QCB1A	Digital In
23	CH 21	Analog In	48	QCB1B	Digital in
24	N. C.	Open	49	AGND	Ground
25	REF JK1	Reference	50	AGND	Ground

Photic Strobe (Sync) cable

The Photic Strobe (Sync) cable connects the Netlink or Netlink ICU unit to the photic stimulator. This cable consists of a BNC male adapter on one end and a six-pin, mini-din adapter on the other. Pin assignments (pinouts) appear in the table below.

Photic Strobe (Sync) cable			
Six pin mini-din adapter		**BNC male adapter**	
PINS	**PIN ASSIGNMENTS**	**PINS**	**PIN ASSIGNMENTS**
1	No connect	N/A	N/A
2	No connect	N/A	N/A
3	No connect	N/A	N/A
4	Coax center	N/A	Photic trigger
5	No connect	N/A	N/A
6	Coax shield	N/A	Shield
Photic lamp			
PINS		**PIN ASSIGNMENTS**	
1		Photic Trigger	
2		Ground	
3		Photic Trigger	
Note: Pins 1 and 3 are grounded together.			

Ethernet Headbox cable

This is a 10 Base T cable that connects the Ethernet board in the computer to the headbox. Pin assignments (pinouts) appear in the table below.

Ethernet cable	
PINS	**PIN ASSIGNMENTS**
1	TD+
2	TD-
3	RD+
4	No connect
5	No connect
6	RD-
7	No connect
8	No connect

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